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1920

A Retrospect.

WITH the end of the year approaching, thoughts turn to a review of the course of its events. The world has not yet settled down in unity and common composure to the serious tasks of attacking the grave problems arising from the ruthless destruction that took place during the war, and of setting the world's affairs on a permanent highway to restoration. The business of large sections of humanity appears to have been, in the prosecution of opportunism and self-interest, to do all possible to delay the acceptance of the principle of restoration as a universal cause and necessity, and to subscribe their best share to its promotion. Through this, the year has been packed full and to overflowing with problems which have demanded from all who have had to deal with them—from our Government and politicians generally, and from the leaders in finance, industry, and trade—anxious consideration, the exercise of their best abilities and judgment, firmness, and tact. Problems have been running in parallel, and, insistent, have had to be dealt with simultaneously. No sooner has one set been solved than others have come to the surface. Though there has been no great war in which this country has been actively engaged, there has been no peace.

We will not dwell upon the foreign and international affairs that have kept the world vibrant and in a state of suspense, and have denied to it those conditions which would have made it all the easier for the nations to apply undivided attention to those matters which appertain to internal reconstruction and progress. Sufficient in these pages will be a glance back at those questions which have immediately affected the interests of the gas industry, though naturally all matters that have entered into the world movements, and have adversely interrupted or assailed the efforts to promote a universal rehabilitation, have effected the British gas industry among the rest. All integrants must be participants; and the gas industry (being an integrant of the country's great system) has participated in the ill-effects of what has been happening, and retarding progress to improved conditions. But these matters apart, in our immediate affairs there have been events that are grounds for congratulation and events that have caused regret. The industry has gained something which has been constructive, which enlarges its horizon, and which will enable it to adjust itself to the new conditions, and to extend its services. This is excellent work long delayed, but now accomplished. On the other hand, nothing has transpired that opens to view any possibility of costs substantially declining in respect of capital or working—nothing to assist but the industry's own inherent power and capacity in realizing, through efficiency gains, greater economies in the rendering of its services. Fortunately, what has been done constructively promises to render aid in this respect if the obscurants who desire that new fetters shall be forged do not achieve their end, and in this way diminish the visible opportunities.

The three matters which have, during the year, prominently affected the industry—in one respect good, in other respects contrariwise—are the passing of the Gas Regulation Act, the unrest in the coal industry which culminated in a strike, and the labour troubles within the gas industry itself. These are the subjects to which, owing to their importance, this retrospect will be largely confined, to the exclusion of general topics. In preface, it may be said that, though coal and internal labour conditions have inflicted additional burdens upon the gas industry, there are good grounds for hope that, out of the year's developments, will come schemes which will, on the one hand, enable the services of the coal miners to be dealt with in an equitable manner, and induce them to increase output (as they are already doing), and which, on the other hand, will allow the pay of gas-workers to be dealt with on systematic lines, and with greater equity than has been the case under the system of national flat-rate increases, which ignore the existence of differences in condition and character of work, as well as any moral obligation on the part of the workers to do their part to lighten the burdens of the industry which gives them employment. To divest themselves of such obligation seems to have been part of the movement in some quarters, though not in all.

THE GAS REGULATION ACT—IMPORTANT EPOCH IN THE INDUSTRY'S HISTORY.

Transcending in permanent importance for the industry all else that has occurred during the year, has been the passing of the Gas Regulation Act. This event is an important epoch in the history of the industry. It is hoped and believed that the Act closes the old era of undue restriction upon the operations of gas undertakings, provides the machinery for restoring the existing capital employed in the industry to (at any rate) the position that it occupied before the war, and opens up new opportunities of enlarged service. Early in the year, it was known that the Bill to be promoted by the Board of Trade would propose the institution of the heat-unit basis for future operations and trading, together with financial revision—the former on the lines laid down by the Board of Fuel Research. Through the agreement to which had been parties the London County Council and the Association of Local Authorities not Owning Gas Undertakings, it was anticipated that, so far as the principle of the heat-unit basis of charging was concerned, the Bill, when introduced, would have a fairly pacific journey. The question of financial revision was more doubtful—that is to say, as to whether or not it would be opposed, and the extent of the opposition, though equity suggested that the principle of revision could not be attacked, but only that of terms. The anticipation was fulfilled; and the question of terms has to be thrashed out where in individual cases there is opposition, and the Board of Trade consider the submissions are of a character that calls for inquiry.

PROGRESS OF THE MEASURE.

It was a weary wait before the Bill was introduced. First, there was promise that it should make its advent before Easter. But the unexpected intervened. There has been pressure upon the Government from all sides throughout the year. Sir Auckland Geddes, the then President of the Board of Trade, who had so far had the matter of the Bill in hand, accepted the position of British Ambassador at Washington; and Sir Robert Horne came from the Ministry of Labour, and took up the office of President of the Board. Pressure of affairs and change caused delay. However, the Bill was introduced by Sir Robert in the House of Commons on Tuesday, May 19; and it received the Royal Assent on Aug. 4—exactly six years after the tragic war was declared, which caused so much destruction of life and property, and brought chaotic conditions upon the whole world, and, among the rest, upon the gas industry, whose statutory conditions were such that there was no hope of recuperation without the help of Parliament. What the Bill contained does not matter; it is what the Act embodies

that interests us to-day. The second reading of the Bill was moved in the House on June 8 by Mr. W. C. Bridgeman, the then Parliamentary Secretary to the Board of Trade, and now Secretary to the Department of Mines; and a matter for gratification was that the motion was seconded by Mr. Hayday, one of the Labour members, and officially prominent in the work of the Joint Industrial Council for the Gas Industry. Many amendments were proposed in respect of detail. The railway companies were very busy, and so were other people who were looking after special interests, or who were desirous of seeing the gas industry the recipients of only a modicum (if that) of anything which could be called justice or which would give it fresh facilities. The National Gas Council, the Gas Companies' Protection Association, and share and stock holders all did their part, with very good effect, in informing members of Parliament of the crippling and unfair conditions under which the gas industry was operating. The industry wanted nothing but that to which it was entitled; but it did not want to lose that to which it was entitled through misinformation, or lack of information, or want of activity to counter that of its opponents.

The Bill was sent to Standing Committee A, over which Sir William Pearce (who knows the gas industry well) presided. The Bill was in charge of Mr. Bridgeman; and Sir Henry Cowan and other members did yeoman service in looking after the interests of gas undertakings. Their indebtedness to Sir Henry is incalculable; and to the Marquess of Londonderry there is great gratitude. But what an immense amount of interviewing, negotiation, conference, watching, and alertness was required of those representing the corporate work of the industry! The President of the National Gas Council (Mr. D. Milne Watson) was forced to new heights in the duties and responsibilities of his office. But he never once shirked them. Mr. Thomas Goulden, the President of the Institution of Gas Engineers, and his predecessor in that office (Sir Dugald Clerk) were always at hand for counsel, or available for conferences. The Committee of the National Gas Council, who were specially charged with the work of keeping in touch with the Bill and its movements, gave unremitting attention to the duties entrusted to them. The same is true of the Gas Companies' Protection Association, and their then Chairman (Mr. H. E. Jones). The interests of the gas industry never had better guardianship.

Before the Standing Committee the Bill was trimmed-up and improved. The result was that it left the Committee materially better than the original draft, though in the two main respects—the heat-unit basis of operation, and the financial revision proposals—the principles incorporated in the draft Bill were unaffected, although made somewhat more explicit. The opponents secured little. Mr. Bridgeman, in the name of the Board of Trade and in the interests of just treatment, was firm against introducing anything that would detract from the constructive change in view and from the selected means of redressing a wrong, and placing the industry on a stronger financial basis. The machinery for testing and control was all discussed while the Bill was in Committee, and the provisions were improved. This also applies to the financing of the work that will have to be done, in connection with which the House of Commons has authorized the payment out of monies to be provided by Parliament, for two years after the passing of the Act, by way of advance, the expenditure incurred by the Board of Trade in the exercise of their powers and duties under the Act—the money to be repaid in the succeeding three years. It was decided in Committee that the pressure of gas should be 2 in. in all mains, as well as in service-pipes between mains and meters of not less than 2 in. internal diameter. There was some question as to whether non-statutory gas companies could apply for an Order under section 1. They cannot, but they can get the powers of section 1 by applying under section 10 for a Special Order, which section also offers considerable latitude for the expanding of a gas undertaking's operations, and bringing about consolidation in suitable areas for supply from works where manufacture can be economically concentrated. We cannot go into details in this retrospect; these things have all had publication and treatment as the developments have been made during the year. An important part of the measure is that the same department of the Board of Trade now takes supreme charge of the testing and certifying of gas-meters, and the machinery associated therewith, and so will make the rules and regulations applying thereto. In this connection, too, meter inspectors and those who carry out the work of testing are in future to prove their qualification by examination. The new rules and regulations are not yet published, and (so we officially learn) are not likely to come into operation before March 1. In the work of securing reform in this direction —reform that is to transfer meter-testing from an antiquated basis to one fashioned upon modern conditions of gas supply and use—the Association of Statutory Meter Inspectors, working in conjunction with the Institution of Gas Engineers, the Society of British Gas Industries, and the British Commercial Gas Association, have been very busy during the year. There was also in Committee an attempt to obtain a clause to enforce benzole extraction; but the proposal was rejected.

INERTS AND CARBON MONOXIDE.

A highly important decision was given by Standing Committee "A" in respect of the controversial question of inerts restriction. So much opposition to this had come from the gas industry (and investigation had declared the restrictions proposed unnecessary with the heat-unit basis of charging in operation), that it was agreed the matter should undergo inquiry by a competent tribunal, as soon as the Board of Trade can conveniently turn their attention to the matter. The research of the Gas Investigation Committee of the Institution of Gas Engineers and the Leeds University (the work of Dr. W. B. Davidson, published in his Institution paper in 1913 must not be overlooked) have practically cancelled the theoretical notions upon which the stand was made in various quarters for inerts restriction. To the same Committee, it was further agreed, the question of carbon monoxide limitation should be referred. The gas industry must be prepared for this inquiry. Those who are hostile to the industry in the matter of carbon monoxide are active; and they are found solely in the Fuel Economy Committee of the British Association, who in this regard are trespassing upon territory that does not concern them. Of this Committee Prof. W. A. Bone is the Chairman; and he headed a little deputation to the President of the Board of Trade—then Sir Auckland Geddes—to tell him of their fears in this connection, without advancing data to show that at any period during the past twenty years (it was about twenty years ago this very question came under the consideration of a Home Office Committee) had there been any proof, despite the growth of the business of the gas industry, that the non-application of the then recommendation as to a 20 p.ct. limitation had caused an increase in fatalities from gas accidents—an increase in number in proportion to the enlargement of the gas business, or in relation to the increased use of water gas, or in contrast with the increase in the number of consumers —particularly during the stress of war-time conditions, when lower quality gas and higher percentages of water gas were distributed. What Prof. Bone appears to feel about the matter was disclosed in greater detail at the meeting of the British Association, and in the abbreviated report that was allowed to be published of the interview of himself and others with the President of the Board of Trade, when, in addition to the limitation to 20 p.ct. of carbon monoxide, he asked that gas undertakings should be compelled to eliminate the cyanogen compounds from gas, and supply gas containing not less than 20 p.ct. of methane, in order to reduce the range of explosibility of hydrogen and carbon monoxide. Yet while all this was going on, the Board of Trade were urging that the greatest possible use should be made of water gas with the view to conserving coal. All through the piece this year, no one else has raised the matter of these additional chemical fetters for the gas industry; and not a word has slipped from Prof. Bone or any of his following in this respect that the claims are supported by practical experience.

FINANCIAL RELIEF.

During the year the case for financial amelioration continued to strengthen. In several directions the disposition of the Government to render help to industries with statutorily limited charges had stronger relief given to it; and there were many important pronouncements by representative bodies and people as to the necessity for making good the financial position of such industries, by amending their charge and dividend powers, in order to give them stability and the necessary attraction to new investment. The

Federation of British Industries went to the length of trying to secure amendments in the Finance Act, in view of the reduced value of money, so that statutorily controlled businesses should be allowed an increased percentage for old capital as well as new. The burden of additional costs, too, upon the gas industry did not lessen, but became heavier and more stringent through the still higher costs of coal, plant, materials, and labour. Though the gas business increased in marked manner, the position of its capital has not improved, but in some cases has got worse despite that lame friend, the Statutory Undertakings (Temporary Increase of Charges) Act, to which more concerns, to save the complete sacrifice of dividends, had to have recourse. But now the Gas Regulation Act is going to put the industry on a new basis, and readjust financial terms so that gas capital is restored to the position at which the war found it—except, we fear, in respect of market values, until changes of a far-reaching order come over the scene.

THE NEW OUTLOOK.

After the Bill had left the Commons, the House of Lords did not take long to deal with it; and the amendments made in it then were of a comparatively trifling order, although tthe railway companies and ôthers did not lose the opporiunity (as at every stage of the measure) for making further neffectual effort to get their desires satisfied. The third reading in the House of Lords was given on July 29; and on Aug. 4, as previously intimated, the Bill received Royal Assent. The text of the Act was published in our issue for Aug. 11, and to that readers must be referred for the exact provisions and the scope of the measure. Meanwhile, steps had been taken to transfer, by Order in Council, to the Board of Trade the powers relating to gas undertakings that have hitherto been exercised by the Ministry of Health, and their predecessors the Local Government Board. Looking at the scope of the powers, through Orders and Special Orders, that have been placed in the hands of the Board, the gas industry is now to a very large extent associated with a single department, through which legislative facilities will take an easier and less expensive course. The importance of this is so obvious that no elaboration of the point is required.

In a measure, the opening period of working on the new basis and terms will be one of experiment and the gaining of experience. Here again there need be no fear. The Board possess the power of amendment, when satisfied that it is desirable or justified. This all means in a not inconsiderable degree the passing of the old legislation and methods of securing new powers, as we are certain that the popularity of the shortest cut and least expensive travelling to secure new statutory authorization will grow. At present there is not (this is evident from the notices of Bills for the next session) full appreciation of all that the Act means and offers. This is not to be wondered at. It is all new; and, being new, a little time must elapse for complete comprehension. The Act, too, opens up new history for gas undertakings. Their administrators, technical officials, and secretarial and commercial staffs will now be working and thinking in terms of therms, not of cubic feet. Gas consumers will be paying for thermal quality, and not volume. The old standards pass; and declared calorific values will take their place—values that can be changed, on obtaining the consent of the Board of Trade, to suit our mutable economic conditions. It is all something that has arisen from the lessons of the war—lessons which have shown deficiencies, and the futility and disservice of over-restriction. The powers in the Gas Regulation Act are the ways chosen for correction.

PREPARATIONS FOR THE NEW ORDER OF THINGS.

The Act passed, then came the preparation for the new order of things. The Metropolitan Gas Referees will soon be relinquishing their title; it is probable they, or certain of them, will become members of the body of Gas Referees under the new Act. There is the Chief Gas Examiner to be appointed; and compulsory appointment of local gas examiners is ensured under the terms of the Act. Everything is to be done that can be done to safeguard the public; and gas undertakings prefer that all that is reasonable shall be done to give the public full confidence in their service under the new Act. The recording gas calorimeter is the instrument which is to be the guardian of the interests of gas consumers and suppliers. Invention and investigation are proceeding in several directions to obtain the instrument which shall find favour in the eyes of the Referees. The Referees are not going to make determination until they have themselves had practical experience of the instruments to be experimentally installed in the testing-stations in the district of the South Metropolitan Gas Company. The period between prescription and the coming into force of an Order will be bridged-over by ordinary calorimetric tests. A transition stage is inevitable. Meanwhile, in gas manufacture, the jet photometer will pass away to join the great accumulation of the obsolete; and the South Metropolitan Company have devised as a substitute the "caloriscope," which was described in our columns as recently as Dec. 1. Whether anything better will come along is a matter for time and ingenuity. The same Company, it is observed, are applying in a Bill to be promoted in the coming session for certain changes which, in their opinion, follow on the new conditions. Apart from changes in manufacture and working which the new order of things will bring about increasingly, many minor ones will have to be effected.

APPLICATIONS FOR ORDERS.

Of immediate importance is the application for Orders. The rules and regulations, the model form of notices, and the schedule of information to be supplied to the Board of Trade when making applications, have been published. Oct. 1 was fixed by the Board as the date on which they would be prepared to receive first applications; but there was a little delay in finally deciding upon and getting ready the various forms necessary to the taking of this step. It was therefore somewhat later than the day appointed before the first applications were lodged; and these consisted of a number of example cases selected by the District Executive Boards of the National Gas Council. Since then there have been many others; and new applications are being lodged every week. But not less than 21 days have to be allowed (30 days in the case of Special Orders) during which the lodging of objections may be made. Then it is within the discretion of the Board to say whether documentary evidence satisfies them, or whether an inquiry must be held before giving a decision. Everything possible has been done to simplify procedure. Now that things have shaped, and have got into running order, we shall hope to be hearing of decisions before long—probably in a week or two.

PRICE PER THERM MOVEMENTS.

The question of the movements that should be made in the price per therm gave rise to some amount of controversy in our pages. It was initiated by Mr. H. E. Ibbs, the Chief Accountant of the Gas Light and Coke Company, who suggested that, instead of having changes which would involve a second or third place of decimals, gas undertakings should adopt movements of one-fifth of a penny—0·2d. He showed how readily this fitted in the scheme of charges and dividend variations under the sliding-scale, and how it would facilitate the work of the office. Dr. Carpenter and Mr. Frank Day, on the other hand, argued in favour of ¼d. movements, which would be understood by the public. Their view is that public understanding should have precedence of accountancy expediency. "Engineer" also took part in the discussion. Mr. T. P. Ridley, of Newcastle, expressed himself (as many others have done privately) in favour of Mr. Ibbs's proposal for 0·2d. changes. In the event, we see that some applicants for Orders are adopting the ¼d. and others 0·2d. movements, while there are instances of the appalling exactitude and complication of running-off into three places of decimals. In connection with prices per therm and their equivalents per 1000 c.ft., at different calorific values, the South Metropolitan Gas Company have prepared a set of tables, Messrs. Clark and Stainer have also compiled a set, and Mr. H. R. Askew has described in our columns a graphic method of making calculations and price changes, and so has Mr. J. P. M'Crae, of Derby. Mr. W. W. Topley, of Croydon, has recently suggested a method of making-out consumers' accounts on the therm basis; and his proposal was discussed in our editorial columns of Dec. 15. What the South Metropolitan Company have decided to do is described in a special article this week.

SOUTH METROPOLITAN AND SOUTH SUBURBAN PROMOTIONS—SLIDING-SCALE ABANDONED.

Next to the Gas Regulation Act, the most striking feature in gas legislation in the past session is the South Metropolitan Gas Company's Act, in which Dr. Carpenter and his colleagues cut-out entirely new courses, one of which, we believe, will have considerable influence in causing gas companies to adopt a substitute for the sliding-scale. The Company's Act brings into force the heat-unit proposals, a "basic" price of 11d. per therm, and the inerts restrictions as finally recommended by the Board of Fuel Research. It also authorizes additional consideration to the Company in respect of divisible profits for exceptional purity of the gas, and several other things. But as a point in new policy, the abandonment of the sliding-scale gives to the Act unusual general interest. The war showed the weakness of the sliding-scale under the old terms, and the danger to the financial stability of gas undertakings, which in the result did an immeasurable injury and injustice to the holders of ordinary capital, and to the industry as a field for investment. The Chairman and Board of the Company sought a way of preventing this recurring; and the assurance that it will not occur again in their case is a financial advantage which a sliding-scale operating both ways cannot give to investors, whatever the terms. There is damaged confidence to-day; and full restoration can only come by uprooting the cause. They proposed a basic price of 11d. per therm; and, at that price, a minimum dividend of 6 p.ct. This, on existing capital, the House of Lords Committee before whom the Bill came reduced to 5 p.ct.—leaving at 6 p.ct. the dividend on new ordinary capital. Then the scheme provides that when the charge for gas is below the basic figure, a sum equal to one-third part of that represented by the reduction shall be taken from the profits, and shall be divided between the ordinary stockholders and the employee co-partners. In this way gas consumers benefit in successful working in the greatest proportion, stockholders and employees in much smaller proportions. The minimum dividend should promote confidence among investors; and for the first time in the history of the gas industry, we have gas workers statutorily entitled to a share in profits over and above the amount required to pay the minimum dividend, in a proportion having definite relation to the benefit received by the consumers from a charge for gas lower than the basic price. The scheme is an attractive one. It has attracted the Cardiff, Swansea, and Harrogate Gas Companies; and they propose (so we gather from their notices of parliamentary applications) to incorporate it in their Bills, or at any rate something upon the same lines. Other gas men have expressed their approval of the plan. The change can also be effected by Special Order through the Board of Trade.

There has been a little feeling shown, and some controversy has taken place, over the reduction of the minimum dividend on the old stock to 5 p.ct. This is admittedly unfair for more than one reason. In the first place, the Company were paying close upon 5½ p.ct. before the war, the value of money has seriously declined, Government securities are paying 5½ and 5¾ p.ct., and industries unfettered by statutory conditions are offering 7 and 8 p.ct. for money. Moreover, most of the existing proprietors paid a premium for their stocks, so that a 6 p.ct. minimum would have been none too much. The Company commenced supplying on the heat-unit basis as from the end of September—adopting the price of 10½d., per therm and declaring a calorific value of 550 B.Th.U. So in applying the heat-unit system, they have been able to lead-off by the passing of their Act simultaneously with the Gas Regulation Act. The Company fought strenuously for the 6 p.ct., and brought expert financial evidence to show that such a dividend was fair in the circumstances of the times. The 550 B.Th.U. gas is equal to 5½ therms per 1000 c.ft.; and so the price per therm only equals 4s. 9¾d. per 1000 c.ft., or 1¾d. above the former price, and ¼d. extra for prepayment consumers.

The South Suburban Company also introduced a Bill which (among matters of domestic importance) included the heat-unit basis of charging and financial revision. In their case they had before the war been paying 6 p.ct. dividend on the ordinary stock; and so—and not for that reason alone—they claimed 6 p.ct. as the standard dividend, with the old sliding-scale on new terms. In their case, too, the Lords Committee reduced the 6 p.ct. to 5 p.ct. on the existing stock, as well as the standard price sought, but allowed 6 p.ct. on new ordinary capital. After considering the position thus created, the Chairman (Mr. Chas. Hunt) and his co-Directors withdrew this part of the Bill in favour of proceeding through the Board of Trade. Their application for an Order has already been lodged.

There were several other matters of interest about both Bills; but this brief reference is only made to draw attention to the points bearing upon the general change. The London County Council put in opposition; but the most striking feature of their evidence (as we showed at the time) was its feebleness. The justice of the Companies' cases was too strong for them; and no one could ever trace the ground in the opposition evidence on which the Lords Committee reduced the dividend from 6 to 5 p.ct.

THE COAL POSITION AND CONTROL.

The coal history of the year has been a lamentable one. Clouds have overhung the industry and the country generally; and the cause has been the permanent unrest in the mining labour world begotten of, and fostered by, the extremists in the Executive and delegate section of the Miners' Federation. It was a good thing that Government control was still in existence, or a super-catastrophe would have followed upon the disastrous events of the twelve months. Scrutinizing these events and the results, one cannot feel that the outlook, even with the increased production, is of a bright order for any considerable reduction in the price of coal. But first as to control. During the consideration early in the year of the Coal (Emergency) Bill by Standing Committee A of the House of Commons, it was stated that the expenses of the Department for the then current year would be some £750,000; so that the country has not had coal control without incurring considerable expense. Control from London has been narrowed down; and it is now simply confined to prices and exports. The decentralization was commenced early in the summer by transferring to the District Coal and Coke Supplies Committees, who were reinforced, the distributive functions of the central authority. It was then recognized that before decontrol to completeness could take place, much more would have to be done in assuring supplies, seeing that the supplies were not adequate for the domestic and trade requirements of the country. As a matter of fact, the export of coal fetching high prices from foreign buyers had to be rigorously curtailed in order to keep the country—especially its industries—properly fuel fed. Despite all that was done, there were many complaints from industries as to supplies—from the gas industry among the others. The change in the control of distribution was the subject of a questionnaire circulated by the National Gas Council, acting in collaboration with the Federation of British Industries, among the gas undertakings of the United Kingdom. Through the last-named organization, it was intended to make an attempt to improve distribution on the basis of quality and desirable characteristics for special industrial purposes. But whatever the effect of the attempt, it has not—so far as quality and desirable characteristics are concerned—been such that it has been markedly palpable. There may be admission, however, that generally speaking, the year in these respects has not come quite up to the extraordinarily bad high levels of one or two of its predecessors. Any improvement is something for which to be thankful. Another slip in decontrol was the suspension as from June 7 of the Household Fuel and Lighting Order, which meant that the Government control of the distribution and consumption of household coal was withdrawn, though there was a temporary restoration of the control in this direction during the coal strike. Mr. A. Ray Duncan, the last of the Coal Controllers, retired from the post on Nov. 30; and so far as control is now exercised, it is in the hands of the Secretary of the Mines Department of the Board of Trade—Mr. W. C. Bridgeman. At his retirement Mr. Duncan took with him the good wishes of all who had come in contact with him; for he was a practical and far-seeing Controller. To him the gas industry owes much for the provision that placed in their possession stocks which enabled them to face the coal strike at least in comfort. In other directions, of course, he was incapable of solving difficulties—for example, in relation to output and inert content—that were brought into existence and continued by other men with more direct power.

THE COAL REBATE.

At the opening of the year, the 10s. coal rebate had had a month's run. It was one of the temporary inconveniences

put upon the country by the Government; and it occasioned a lot of work for the purveyors of gas and electricity, inasmuch as it only applied to coal used for domestic and household purposes, and not to coal required for industry, and therefore only affected the quantity of gas sold for domestic use. It was intended, too, that the rebate should apply to coke used for household purposes; but this was abandoned owing to the complication involved. Instructions were issued by the Coal Controller as to how the rebate was to be obtained, and how the allowance from the price of gas was to be calculated. Misinterpretations were the result; some gas undertakings going to the length of announcing a fixed reduction in the price of gas for domestic purposes, while the intention was an allowance to be calculated, and deducted from the gas account. We need not enter now into all the difficulties encountered. There was a lot of correspondence over what was meant by the term "previous" quarter in the instructions. In the correspondence, the Manager of the National Gas Council (Mr. E. J. Fottrell) took prominent part. The upshot was that he obtained a definite ruling on the subject from the Coal Controller to the effect that the allowance should be calculated upon the coal carbonized and the gas sold by an undertaking in the quarter prior to that for which the allowance was to be calculated—for instance, the rate of allowance for the January-March quarter was to be calculated upon the quantity of coal carbonized and the gas sold during the October-December quarter. It was estimated that 10s. rebate for domestic and household coal, including that supplied to gas and electricity undertakings, would probably apply to 23 million tons for the four months from Dec. 1 to March 31, 1920. The cost of the reduction, including compensation to coal merchants in respect of stock, together with the estimated cost of coastwise bunkers, was calculated at £12,600,000. The rebate was only continued into part of the second quarter—after lasting, from Dec. 1, a little over five months. An increase in coal miners' wages (as will be seen later) necessitated an increase in the price of coal; and the decision of the Government was that the 10s. rebate must be discontinued and 4s. 2d. per ton added—making the price of domestic coal 14s. 2d. higher, and industrial coal 4s. 2d. more. No rebate could be claimed for coal dispatched from the collieries on or after May 12.

Coal Stocks and Output.

In the early part of the year, the position of coal stocks in many gas-works became very critical; and there was considerable outcry as to the heavy shortage. France and Italy likewise suffered acutely. In January there was a deputation from the National Gas Council to Sir Adam Nimmo and the Coal Controller. It was reported that there were over 400 gas-works in the country with less than a week's stock in hand. It was also then asked that the plan of equal monthly deliveries winter and summer should be discontinued; and that the old rates of 40 p.ct. summer and 60 p.ct. winter should be re-established. Of course, the former would not be a bad plan if all works had the accommodation and the facilities for delivery, and if the additional cost of coal and of extra handling was not a drawback. On the other hand, security more than cost will have to be considered in the future. The shortage in gas coal was pretty general in the different areas of the country. So bad was it in Scotland that a Committee was appointed by the District Executive Board of the National Gas Council to interview Sir Adam Nimmo. Throughout the discussions, much blame was attached by the authorities to the condition of transport facilities, which the Ministry of Transport are continually saying are progressively improving. In February, at a meeting of the Midland District Executive Board, it was reported that many gas-works were on the verge of a breakdown. Several, it was stated, had less than a week's supply; and Birmingham had then only sufficient to meet little more than two days' requirements. Similar reports reached us throughout February and well into March; and during that time the question was frequently raised in Parliament—in fact, the National Gas Council used every channel of influence in their efforts to bring about some improvement.

There did not appear to be much reason for this shortage, seeing that the output of coal in 1919 showed an improvement of 3½ million tons; becoming, in round figures, 230 million tons—true between 57 and 58 million tons less than in 1913. On the other hand, the inland consumption of coal in 1919 was down to 179,513,165 tons, compared with 183,626,609 tons in 1918, and 200,012,343 tons in 1917. And the output figures for January to March were good as compared with the preceding months—in fact, the first quarter of the year was the best to September for output. Yet, in the first quarter, production was only at the rate of about 200 tons per man per year, whereas it was estimated it should be 270 tons, less one-eighth for the reduction of the hours of work, or 237 tons. More men being employed than in 1913, it was also calculated that there should be some 38 million tons of coal available for disposal during the year. But estimates and actualities have a bad habit of not running with linear consistency. For the quarter ending March, the output was 62,103,000 tons; and the average number of persons employed was 1,188,500. For the quarter ending June, the production was 58,166,000 tons, and the persons employed numbered 1,200,300. For the quarter ending September, the output was 59,222,000 tons, and the number of persons employed 1,207,800. Much was said in the opening months of the year about the slackness of the miners (speaking of them as a body); more could have been said subsequently—although not latterly. However, the pressure of complaint induced the Prime Minister to make the announcement in the House in March that, as the result of co-operation between the Coal Mines Department and the Ministry of Transport, an actual increase in the movements of coal had been brought about during the then preceding fortnight. But the effect was not felt much by gas undertakings.

Complaint continued well into May, and so did questions in the House. Things eased with the lengthening days; but with the poorer weeks' returns that came in, talk commenced as to the disquieting outlook for stock accumulations for the winter. The Coal Controller, with this position facing him, and seeing clouds gathering on the coal labour horizon, worked his hardest for the public utility undertakings; and, as events showed, it was well he did. When the great strike came in October, it found the gas-works in London and the surrounding areas able to stand the shock of a strike for about two months; and in some cases, by the use of water gas, longer than that. We had information as to three months in certain instances. In the Provinces and Scotland the provision varied from one to two months' supply. But however far the strike necessitated dipping into these stocks, the provision for the winter months was proportionately depreciated. Fortunately, owing to conditions attaching to the termination of the strike, there was increased energy on the part of the miners; and in the week ending Nov. 13, the output was 4,775,600 tons. For the week ending Nov. 20, there was an output of 5,210,700 tons, which exceeded the next best during the year, which was in the week ending April 24, when the output was 4,989,666 tons. In the week ending Oct. 16, on which day the strike begun, the production was 4,611,600 tons. The output for the week ending Nov. 27 was 5,176,500 tons. In the week ending Dec. 4, it was only less than this figure by 300 tons; and in that to Dec. 11, it was 5,205,400 tons. So that the outlook for supplies is more promising. But the Mines Department refuse to allow for the present greater exports. And the decision is right, on account of the depletion of home stocks. Only about a fortnight since, the Department issued a statement in which they said that 230 gas, electricity, and water works throughout the country had under one week's coal stock, and about 400 more had less than two weeks' stock, with the Christmas and New Year's holidays approaching. The National Gas Council are still pressing for supplies in larger quantity and of the better qualities.

Inerts in Coal.

The actual output of coal during the year, when brought into comparison with the figures for 1913, is worse than the returns indicate. The returns, in fact, are very misleading, as they take no account of the increase in the quantity of inert material supplied. Mr. J. H. Canning, in his Presidential Address to the Wales and Monmouthshire Institution, made the point that if the 12½ p.ct. increase of ash in the coal delivered to the Newport (Mon.) Gas-Works compared with 1913, was added to the reduction of output, the actual falling-off in output in the South Wales coalfields would be 26·5 p.ct. If we assume that the 12½ p.ct. average increase in ash was applicable to the whole of the coal production of the country, then this year alone it would mean something

like 27½ million tons of absolute rubbish had been conveyed, handled, and paid for as coal, and was producing uneconomy wherever it was used. Complaints came from many quarters of the gas industry—not only in respect of inerts but of unsuitable quality. In the instructions issued under the Mining Industry Act, it was stated that, owing to the complaints made as to the inadequacy of washed coal, and with the view of securing its greater output, an increase not exceeding 2s. 6d. per ton in the price charged had been allowed. Gas undertakings rebelled against this new imposition. Strong protests were made; and the Coal Association decided to forego the charge. The House of Lords gave an important decision in the spring in connection with an appeal as to deductions for stone and dirt in arriving at the amount to be paid to miners who were paid by weight. Viscount Finlay said he could see no warrant for the view (as adopted by the Court below) that a man was entitled to be paid on the whole contents of a hutch, including what was admittedly not coal.

THE ACTIVITIES OF THE MINERS' FEDERATION.

The Miners' Federation were a perpetual source of worry to the Government and the country throughout the year; and all due to the preponderating power of the extremists in the Executive. Their wants were many and vagarious; and their attempted dictation and autocratic methods intolerable. They began early in the year asking for a reduction in the price of industrial coal, and in the cost of living. Later on they would not have the price of industrial coal reduced on any account, but made claims for the reduction of domestic coal by the 14s. 2d. which their own action and the necessity for placing the industry on an economic basis had brought about. Increases of wages were also demanded; and compliance insisted upon without inquiry. The demands of the Federation were conclusive, or there was always the threat to apply force. The methods and the manner in which the demands were preferred set public opinion strongly against the miners. Again and again the Executive of the Federation wanted to gamble on prospective and unknown profits which the miners themselves did their best to ruin by diminished production and the consequent shortage of the coal available for export. Much public time was absorbed in the preparation and discussion of various statistics in dealing with the demands of the Federation. The Government showed again and again that the Federation were wrong in their assumptions and calculations; the Federation said the same thing regarding the Government computations. No good purpose would be served by dealing with the arithmetical wrangle that went on. Differences in the period taken were alleged by the Federation to be at the bottom of the discordant results in respect of export profits; for there were none on home coal. The whole point was that the Federation were endeavouring to ascertain the likely amount of the profits on the year from export coal with the view of formulating demands in the interests of the miners who were already being well paid per ton of coal raised, or for time worked per week. There was also another objective that the extremists had in view, and that was nationalization. In March, the Federation determined to ask for an increase of 3s. a day for workers over 16 years of age and 1s. 6d. for boys. This was the then alternative to nationalization; because they could not have one thing, like spoilt children they would have another. Conferences followed with the Coal Controller and the Prime Minister; and ultimately the Government proposed a revision of the percentage rate to 20 p.ct. on contract rates or gross earnings (excluding the war-wage and Sankey award, together 5s.), with a minimum of 1s. 6d. for men and 9d. for boys. This was a generous offer; and for the country it was regarded as better than the flat-rate submitted by the Federation, seeing that it was thought (but events falsified this) that it would be an incentive to the hewers to increase their output, and so supplement supplies. The Federation tried to get the Government to increase the percentage; but they refused, though changing the guaranteed minimum to 2s. a day to all workers above 18 years of age, 1s. to workers between 16 and 18 years, and 9d. to boys under 16 years. This offer was accepted by the miners; and it was estimated that it would cost about 4s. a ton, or roundly 40 millions a year.

LEADING UP TO THE STRIKE.

Owing primarily to this increase in cost, there came the announcement as to the cancelling of the rebate of 10s. on domestic coal, and the price of both domestic and industrial coal being raised by 4s. 2d.—virtually making domestic coal dearer by 14s. 2d. This was the initial cause of the great strike. The gas industry did not grieve over the withdrawal of the rebate, the insecurity of the basis of which is shown by the rapid change from the position that prompted it, to one that not only demanded its cancellation, but the addition to the price of 4s. 2d. The reason advanced by the Government for doing this was that the time had arrived when the coal industry should be placed on an economic basis. To do this necessitated the withdrawal of the rebate, and 2s. 10d. of the 4s. 2d. was attributable to the increased cost of production—the balance between the 2s. 10d. and the 4s. 2d. being the sum by which the average price of inland coal was short of the sum of wages, other expenses, and coalowners' profits. The 4s. 2d. represented in round figures a £4,000,000 addition to the coal costs of the gas industry.

The Miners' Federation began to make trouble over the increase in the price of domestic coal, but not industrial, though earlier in the year they were anxious for the latter to be reduced with the view of helping to lower the cost of living. The policy of the Federation was to curry favour with the public. The threat was not long coming that, if the increase in domestic coal was persisted in, the miners would apply for another increase of wages. This quickly matured; and the request was for a 2s. advance per day for men, and 1s. for boys, with a reduction by 14s. 2d. per ton of the price of domestic coal. Three months or so of heavy clouds and of uncertainty succeeded. The Miners' Federation, owing to the predominant weight of the extremists in the Executive, assumed the rôle of dictators to the Government; but the Government would have none of it. They were willing to confer, and refer the matter of wages to a specially constituted competent tribunal; but they declined, as the elected representatives of the people of the country, to be dictated to as to policy or coal prices or to be stampeded by the threats of any one section of its workers. The Triple Alliance said the claims were just, but on what grounds nobody outside knew. The Trade Union Congress said precisely the same; but no reason was allowed to escape. There was chaos in the Labour world over the matter. Moderates prayed that the worst might not befall. Sir Robert Horne and Mr. Smillie were prominently and constantly in the limelight; and the Premier for a while took no active part in conferences, though he did later on. The Miners' Federation wanted the increase in wages and the reduction in the price of domestic coal to come out of the pool of anticipated profits on export coal—the two demands representing something approaching 66 millions per annum. The miners were doing nothing to contribute to the profits on export coal. The Government properly held that the surplus profits must go to the exchequer. Without them, while all other industries were paying excess profits duty, the coal industry would be paying nothing. There came a shock for the Federation, which showed that, in the June quarter, owing to the enforced reduction of exports due to the short output, the profits on shipped coal had been reduced to an alarming extent. Nevertheless the Miners' Federation stood firm for the time, but ultimately dropped the demand for the reduction in the price of coal, though adhering to the claim for more pay, which, however, they still obstinately declined to leave to the arbitrament of a competent tribunal.

Aug. 12 was a critical day. A special conference of the Federation was held, when it was decided to take a strike ballot of the miners; and headquarters strongly advised the latter to vote for a strike. The ballot papers were returnable not later than Aug. 30. In a fighting speech at Wrexham, Mr. Smillie stated that the miners could not climb down; and it was clear from what he said that there were in the Executive men who looked upon the present development as a means of forcing nationalization. But Mr. Smillie soon found that he had gone too far, and had to deny that nationalization had anything to do with the dispute. The ballot was proceeded with, and gave a majority of 367,917 in favour of a strike; but there was the significant number of 238,865 votes against taking strike action out of 904,000 then in the membership of the Federation; while the total of the employees in the mines was 1,206,000. Many voted in favour of a strike out of loyalty to the Federation; and many irresponsible boys were among those favourable to extreme measures being taken. Then came a time of great activity in the attempt to avert the catastrophe. There were conferences with Sir Robert Horne, at the Board of

Trade, and later on with the Premier. Everything possible that the Government could do without violating their position as trustees of the nation was done. The Government not only offered to refer the matter of wages to an impartial tribunal, but as an alternative suggested there should be a conference between the representatives of the Federation and the mine owners to ascertain whether they could arrive at means for regulating pay on the basis of production. There was division of opinion in the Executive of the Federation regarding acceptance of these proposals—some were in favour of the one plan, some in favour of the other, while some wished for the whole claim to be pressed for. The Government made it quite clear that, whatever happened, they would not accept any instructions from anybody as to the regulation of the price of coal. The Federation pressed for an inquiry into this also. But there came the White Paper which showed that the net profit on exported coal during the June quarter was only £750,000; while the wages paid to the miners on disposable coal was no less than 25s. 5·72d. per ton. [In the September quarter, wages averaged 26s. 3·06d. per ton.] Then the question of price reduction was abandoned by the Federation, who asked that the increase of wages should be at once conceded, and then the question of consolidated payments on the basis of output with a view to greater production could be considered afterwards. The Government, however, would not betray the interests of the nation in this way. After a conference with the Prime Minister, strike action was postponed from Sept. 18 to 25, to see whether a datum line of production could be arrived at between the mine owners and the Federation. There was success, and then came a second ballot of the miners as to whether or not this new basis should be accepted. The intention of the Executive of the Federation was that the question should be left to the unfettered judgment of the men; but the extremists got busy locally, clamoured for an immediate increase of 2s., and for the rejection of the datum line. Mr. Smillie appealed to the men to accept the datum line and the accompanying terms; but the implacable enemies of the community gained the day, and the voting was against acceptance. Further effort was made by the more responsible men of the Federation; but very judiciously the Government would not give way without security for a *quid pro quo* for extra pay. The Federation said they had explored every possible avenue to escape the misery of a strike; but that they had not done so was shown not only by their rejection of the constitutional course of referring the matter to an impartial tribunal, but by the terms on which the strike came to an end.

The Strike and its Settlement.

The strike came on Oct. 16. It was well known that the responsible men of the Federation had hoped until the last minute that the Government could be forced to concede their demands. They realized that funds and the cost of living were against the Unions who would be involved directly in the strike; and the Trade Unions who were not directly involved saw unemployment in mass staring them in the face, with a misery for the workers and their families intensified by the prevailing conditions. Some of the hotheads in the other branches of the Triple Alliance wanted to bring pressure upon the Government by striking; but the leaders in the Executives of those bodies showed greater prudence. The Miners' Executive, too, saw there was a marked division of feeling in the rank-and-file of the railwaymen and the transport workers; and they recognized that any call for a strike in those quarters would only lead to partial compliance. This would have seriously prejudiced the position of the miners. The miners' response to "down tools" was general. Within three days Mr. W. Brace, one of the miners' representatives, submitted a scheme to the House of Commons for putting an end to the trouble; but the scheme, good in some respects, was defective in that there was no guarantee in it that, if the 2s. was conceded, there would be a response in the way of additional output. The lesson of the Sankey award is that increased wages must be the result of increased production. But what Mr. Brace did show was that, though a strike was on, though the whole of the mines were silent, though coal was not being produced, there were leaders who wanted to bring these conditions to an end as soon as possible.

Behind the doors at the Board of Trade, men earnestly conferred, day by day; and so much success resulted that the conference widened, and a basis for a temporary scheme on values resulted. This was a compromise, to give time for a permanent scheme being submitted to the Government by the mine owners and the men's representatives not later than March 31 next. It also provides for a National Wages Board to obviate all future bargainings between the owners and the miners. The temporary arrangement gave the men their rise of 2s. per shift for workers over 18 years of age, 1s. for those between 16 and 18 years, and 9d. for all below 16 years. The payment was guaranteed by the Government till December 31. During January the wage is to be the same as the December wage, if values from export sales exceed the values of the average exports for the September quarter by a sum sufficient to cover the full wage advance. The five weeks ending December 18 constitute the period to be taken to ascertain the increased values for regulating the January wages. Should the value be less than the amount required, then for every £288,000 less than the full amount needed, a reduction of 6d., 3d., and 2¼d. for adults, youths, and boys respectively will take place on Jan. 3, 1921. Roughly worked out, this means that, when the output rate is not less than 238 million tons, the men will get 1s. per day increase, and an additional 6d. per day for every 4 millions beyond. The men are, as already seen, trying to earn the addition.

The strike lasted practically two-and-a-half weeks; its duration being longer than it would have been owing to the necessity for taking a ballot of the men to ascertain whether they would accept the conditions. The extremists again got busy to prevent acceptance. But a large proportion of the men had had enough; and there voted for acceptance 338,045, and against 346,524. Thus only about 75 p.ct. of the members of the Federation voted; and as a strike can only be declared on a majority of two-thirds of the men voting, the same rule applied to the ending of the strike. The strike was declared at an end on Wednesday, Nov. 3; and the following day the men started work.

One result of the strike was that two of the members of the Executive of the Federation—Mr. William Brace, M.P., and Mr. Vernon Hartshorn, M.P.—resigned, refusing to have any more to do with a governing body controlled, in numbers, by extremists whose lack of a sense of responsibility had been one of the features of these turbulent times. Mr. Brace is now Labour Adviser to the Department of Mines. Other effects of the strike were that the miners, so it was computed, lost between 16 and 17 millions in wages, and their Unions 2 millions. The coal production lost was between 16 and 17 million tons; the estimated value being £26,500,000. Many other industries suffered severely; and there was much unemployment. The deficit on the railways in October during the strike was over £4,000,000. The dislocation and loss of traffic due to the strike extended into November; and the Minister of Transport reckons the strike cost the country some £8,000,000 on the railways alone. Shipping and employment in the shipping industry suffered severely. Gas undertakings, having to work from stock, found their expenses for labour considerably augmented, and winter provision largely depleted. The strike was an expensive matter for the country; and the blame lies at the doors of the Miners' Federation.

Emergency Orders and an Act.

During the strike, various Emergency Orders came into force. Gas undertakings were ordered to make their coal last as long as possible, and reduce their gas to a serviceable quality—450 B.Th.U., the war-time prescription, being mentioned. Outside shop lighting, advertisement lighting, and in fact all unnecessary lighting, were prohibited. The Order went forth as to a 50 p.ct. reduction for power. The National Gas Council pointed out to the Ministry of Mines the impossibility of ensuring the carrying out of this instruction; and there was not any serious insistence upon this part of the Order. During the strike, too, the Emergency Powers Act was placed on the Statute Book; this being a measure for making exceptional provision for the protection of the public in cases of emergency—among the objects is the securing and regulation of the supply and distribution of food, water, fuel, light, and other necessaries.

Other Coal Topics.

Two or three other matters affecting coal can only be touched upon lightly. The Department of Mines, as already seen, has been brought into existence, with the Right Hon. W. C. Bridgeman as Secretary. This was done through the

powers of the Ministry of Mines Act which was passed during the session; and with the machinery the Act provides, the Department has full surveillance over the entire industry. Another interesting point is that, while our exports of coal have been declining, through compulsory restriction, owing to low production, the coal export traders of other producing countries have been opening-up new business in markets which were formerly the possession of this country. France is now well supplied with American and German coal, and does not want coal now from South Wales. The total coal exports for the eleven months ending November only amounted to 22,629,777 tons, compared with 32,315,713 tons in 1919, and 67,170,665 tons in 1913. A matter which, in addition to the many others already mentioned, gave dissatisfaction in the gas industry was that several collieries appointed factors and sales agents with the view of securing commission on factorage. The addition of 6d. to 9d. per ton that resulted from this practice was not something that could be willingly borne in these times. The National Gas Council protested to the Mines Department; and later the Council were informed that after September, 1920, no factors would be allowed to intervene between consumers and collieries beyond those already existing.

COAL CONSERVATION—GAS-MAKING DEVELOPMENTS.

The importance of the question of coal conservation—in view of the conditions prevailing in the coal industry, and of the national necessity for making our coal supplies go as far as possible, and putting coal to the most profitable use—has gained stronger recognition during the year. The report on the subject prepared by Sir Dugald Clerk and Profs. Smithells and Cobb has had a larger effect than was apparent on the surface for some time after it made its appearance. The subject formed the main part of the "James Forrest" Lecture delivered by Sir Dugald Clerk to the Institution of Civil Engineers. It was the topic of a debate at the Institution of Electrical Engineers, which Sir Dugald opened, and in which Prof. Smithells and Prof. Cobb took part, and on which occasion the figures contained in the report were not in any way destroyed by the electricals. The written reply to the debate which Sir Dugald made, and which was published in our columns, was highly valuable, particularly in relation to the facts that he presented as to the position of the gas-engine, in connection with the competition of the electric-motor. The Board of Fuel Research are doing great national service under the direction of Sir George Beilby; and they have before them a programme of work relating to carbonization which will absorb a large amount of time, and necessitate a vast amount of research, the results of which are bound to be very valuable. The Gas Investigation Committee of the Institution of Gas Engineers and Leeds University are also exploring coal carbonization, in addition to the behaviour in use of different grades of gases; and their fourth report is highly informative. The Federation of British Industries have appointed a Fuel Economy Committee (with Prof. Bone as Chairman), who are devoting themselves to the improvement of the use of fuel in industry. There is room for great economy in this direction; for it has been proved over and over again that in steam-raising the average economy falls far short of what it should be, and in heating there is a great expenditure of fuel in relation to production, which condition the gas-furnace is progressively changing. Mr. E. W. L. Nicol has shown on more than one occasion during the year the savings and the high efficiencies that can be secured by the patent "sandwich" system of using coal and coke breeze for boiler firing. Some large installations have been made at electricity generating stations. The British Association Fuel "Economy" Committee, as already seen, have been active in trying to get restrictions imposed upon the gas industry which would divert it from the realization of maximum economy, and bring upon it uneconomy. The Committee have also opened up other work which may be more fruitful, and therefore useful to the country.

The gas industry has continued to do its good share in fuel economy through its manufacturing processes, and by its prosecution of work in developing the industrial uses of gas and coke. The trend of things in regard to gas making is to produce more therms than ever before per ton of coal treated. In this direction, by means of charge steaming, separate water-gas making (in which improvements have been effected in relation to producing and fuel efficiencies), and the more complete gasification of coal (several plants are in operation, and more are coming along, in works large and small), more and more has been done, and will continue to be done. The Gas Regulation Act is one of the best of incentives to technical endeavour the industry has ever had in this connection; and we may be seeing big advances along this particular road. Very high efficiencies are being obtained, taking the products of gas, coke, and tar together, on which point there has been a good deal of controversy—Sir Dugald Clerk and Mr. George Helps being the principal disputants—during the year in relation to electrical operation. The thermal efficiencies based on gas alone are also going higher and higher; and this is important in trading on the heat-unit basis. Such matters as these were dealt with by Sir Dugald Clerk in his Presidential Address to the Institution of Gas Engineers. Mr. H. J. Hodsman and Prof. Cobb set new anticipations afloat regarding the use of oxygen in gas production (thus realizing higher efficiencies), providing the price of oxygen is reduced to a feasible level. The use of oxygen would make gasification by internal heating a continuous process without loading-up the gas with nitrogen. The Society of British Gas Industries contributed at the meeting a paper on "Carbonization," which showed that our plant manufacturers are keeping abreast of the times in the matter of gas-producing plant. Speaking of lower-grade gas generally (lower calorific power per cubic foot), Greenock and Oldham have shown some remarkable experiences in the supply of gas of from 400 to 420 B.Th.U. per cubic foot; and Mr. George Helps gave a series of demonstrations at Westminster in March as to the use of lower-grade gas, which attracted considerable attention.

We cannot traverse in detail all these matters; but as the meeting of the Institution showed, the times are teeming with development and change; and there is room for it, seeing that the visible potentiality as measured by Sir Dugald Clerk is ten times the present gas output in heat units, subject to the cost per therm being sufficiently low. All this means conservation of coal by transferring it from the domestic grate and industrial furnace to be dealt with in gas-works, and utilizing the gas at an efficiency which coal cannot possibly achieve.

In all this work, there is a growing feeling that development must pursue a course which will conserve the tar oils and the ammonia. In the paper which Mr. Fred J. West and Mr. T. A. Tomlinson read before the Manchester Association of Engineers, they reminded us how, during the war, trials that were made for the Ministry of Munitions with continuous vertical retorts demonstrated conclusively that large quantities of fuel oil could be produced at the higher temperatures practised by gas-works, with a good production of ammonia. Sir Arthur Duckham, in his paper before the Institution of Petroleum Technologists, held that in any system aiming at the more complete gasification of coal, the tar oils and the ammonia must be preserved; and he outlined what he considered would be an ideal system of treating coal, in which there would be great economy of heat and a high efficiency. One point made by those who favour complete gasification is that the gas has more complete consistency than has water gas with ordinary coal gas. The Tully plant has been making great advances throughout the country in adoption.

Heat efficiency is a point that has received a great deal of attention this year—heat economies in gas manufacture derived from the utilization of heat now wasted. Several installations of vertical retorts are now being erected, the waste heat from which is being utilized in generating steam for charge steaming and other purposes, and water-gas plants are now being made to produce their own steam by utilizing heat formerly wasted. The room for this is admitted. Mr. E. G. Stewart, in a paper published in our columns, dealt at length with these matters; and so did Dr. Bunte, Mr. W. Temple Gardner, and Mr. H. L. Nicholson, in other papers which we printed. The matter was also referred to at the Institution meeting.

All this bears upon the conservation of coal; and so does the use of coke-oven gas for town supply, which continues to extend. This was a subject that was largely dealt with at the annual meeting of the Society of Chemical Industry. Gas undertakings are more and more adopting parliamentary authorization for the supply of power gas to industrial works. This is a prudent measure in view of the activity of the owners of other processes to get plants installed for the purpose. Section 10 of the Gas Regulation Act favours this development.

SECONDARY PRODUCTS.

There are a few points regarding secondary products specially appertaining to the year to which reference may be made, although it is impossible to dwell at length upon the many matters associated with them to which attention has been drawn in our columns. Generally speaking, bye-products have done well for gas undertakings, although their percentage return in relation to costs of gas production has been somewhat lower than the figure obtaining before the war.

Coke has been selling well, though in some cases heavy accumulations began to occur through the refusal of the Mines Department in many cases to grant licences for export. They would not allow licences for export where the coke had to be carried across the country to a port, nor would they permit them until local requirements had been fully complied with. These generally were the instructions issued to the District Coal and Coke Supplies Committees; and the instructions were dealt with in some instances in such a way that a great deal of dissatisfaction occurred among gas undertakings. The National Gas Council moved in the matter, and procured some amelioration of the arbitrary manner in which the applications for licences were dealt with, although there is still a good deal of feeling in the industry that more generosity in this respect might be shown. Those gas undertakings that are situated in favourable positions for the shipment of coke have done extremely well from their foreign trade. The Board of Trade returns show that, in the eleven months ending with November, 696,094 tons of gas coke were exported, and 852,530 tons of other sorts. The value of the gas coke is put at £4,307,799, or an average of £6 3s. 9d. per ton, which does not represent the best figures of the year. Through this windfall, the fortunate gas undertakings that secured this business were able to make considerable reductions in the price of gas.

With regard to tar, the price has gone up in a satisfactory manner. Several districts have adopted sale schemes with the distillers, similar to the one put forward by the National Gas Council; and the result has been very beneficial.

Sulphate of ammonia has received a large amount of attention during the year. The Sulphate of Ammonia Association has passed out of existence; and the British Sulphate of Ammonia Federation has taken full charge of the interests of sulphate of ammonia makers. The equalization scheme continues to be a pronounced success. The Ministry of Agriculture has been seeking a Director (temporarily) for the organization of demonstrations with artificial fertilizers in this country. Although sulphate has been selling well among home farmers, propaganda work will have to be continued for the best of reasons. Competition is, we believe, going to grow rapidly. The statistics from Germany that have been published point to this, especially in connection with synthetic ammonia. In this country, too, there are large developments proceeding—such as by the Georges Claude synthetic process, which has been taken up by Cumberland Coal, Power, and Chemicals, Ltd.; and a Company called Synthetic Ammonia and Nitrates, Ltd., has been formed by Messrs. Brunner, Mond, & Co., to run the Bellingham-on-Tees works, which were purchased from the Government. A point upon which close watch will have to be kept is that at these works chloride of ammonia is also to be produced; and this it is stated is equal, if not superior, to sulphate. The Nitrogen Products Committee's report was a voluminous affair, and advocated considerable extensions of plant for increased ammonia production. It looks as though private enterprise will do all that is necessary in this regard.

The lines of sulphate of ammonia work in the gas industry are towards improving the quality of production and saving ammonia. In the latter respect, the late Chief Inspector under the Alkali Works, &c., Regulation Act (Mr. W. S. Curphey, whose successor is Dr. T. Lewis Bailey) called attention to this waste in his annual report; and so did Mr. D. V. Hollingworth and Mr. E. J. Fottrell, through statistics published in an article contributed to our columns. The production of neutral sulphate of ammonia is making good progress, but not at such a rapid rate as is desirable. It has been the subject of correspondence in our columns; and there was an excellent discussion upon it at the last meeting of the Southern District Association (initiated by Mr. E. V. Evans, F.I.C.) which should have a good effect in stimulating the quality of sulphate. The Wilton neutral system was also described in our pages on Dec. 15. The Fertilizers (Temporary Control of Export) Act, during its progress through Parliament, received some amount of criticism. The object of the measure is to prohibit the exportation of certain fertilizers, so as to ensure that farmers at home are provided with a sufficient supply. An attempt was made to secure an amendment which would give liberty to each maker to obtain a licence for the export of the proportion of sulphate not reserved for home use. This amendment was sought by producers representing the small percentage of make not coming within the equalization scheme, which embraces some 90 p.ct. of the total production. They were unsuccessful. New prices for sulphate were published by us on May 25; and, owing to the increase of railway rates, the Ministry of Agriculture sanctioned, in the latter part of the summer, an increase of the agreed maximum prices by 3s. 6d. per ton in the case of all deliveries made after Sept. 1, except prices *ex* works or by rail. Owing, however, to the decline in the world-price of nitrogen, prices for sulphate have been reduced. The January price is to be £23 16s. per ton delivered, instead of £26 13s. 6d.—a reduction of £2 17s. 6d. per ton. The February price will be £24 3s. 6d.; and the March-May price £24 11s. The manufacturers are to repay any sum in excess of £23 16s. which has been paid for deliveries during the period August to December.

A Committee of the National Gas Council was appointed (with Mr. Thomas Glover as Chairman) to consider the question of the price of spent oxide and sulphuric acid; and the upshot of conferences with the National Sulphuric Acid Association was an agreement to reduce the price of acid made from spent oxide from £6 2s. 6d. to £5 10s. per ton as from Jan. 1. The direct process of sulphate making for gas-works came under a cloud through the abandonment in Mr. Curphey's report of hope of improving results; but in a paper by Mr. Alec. G. Cheal at the Southern Association meeting, it was shown that success could be achieved on small works, if the plant conditions were right, though care was required. Prof. Cobb, we believe, is still working at his direct process, which is intended to obviate the employment of sulphuric acid. The process consists of washing the crude gas with a solution of zinc sulphate, which, after performing its function, is regenerated for further use.

Benzole has had a lively time during the year. The price was put up by 4d. early in the year, and later on by 7d. A great fuss was made over these increases. After the first advance, the Profiteering Committee in effect condemned it; but they distinguished themselves by making the basic error of regarding a gallon of crude benzole as producing a gallon of refined. There were also great complaints by motor users as to the falling-off of production; but many gas undertakings that were once producers were unable to continue—largely owing to the low price of the crude product. It was hoped the higher price of refined benzole, enabling the National Benzole Company to pay a better price for crude, would encourage increased production. It is very desirable that sales of crude should be to the Company rather than to the oil companies, despite the temptation of a penny or two more per gallon, offered for obvious reasons. The annual report of the National Gas Council stated that costs and prices were being considered in view of the dearth of motor spirit. The motor users' organizations were very persistent during the year in urging Parliament to impose compulsory benzole production on gas undertakings. This was resisted; and there has been no success. The Board of Fuel Research are carrying on investigations into the production of benzole. Much has been heard of alcohol during the year; but the sum and substance of it is that much more will have to be heard and done before deciding whether it can be made on a commercial basis for use as a motor fuel. At present the raw materials would fetch more money for food purposes than for alcohol making. But the matter is being investigated in all parts of the Empire, so something may turn up at any time.

LABOUR TROUBLES IN THE GAS INDUSTRY.

The claims of labour in connection with the cost of living and an improved standard of living, the reduction of hours and of production, strikes and rumours of strikes, direct action, nationalization, and trade union combinations, have all supplied prolific topics for discussion during the year. Rates of exchange may be largely responsible for the posi-

tion to-day in industry and commerce, and for the unemployment that exists. But labour has had a good share in crippling this country in its struggles to keep its end up in obtaining business abroad. The policy of the trade unions is wrong; and many thinking labour leaders realize this, and do not hesitate to speak their minds. But it has been a year in which the extremists have reigned prominently in the counsels of labour, and labour has largely followed its mentally blind leaders, rather than those whose vision is clearer. The red flag has had greater attractions than the red light. But the truth is spreading, or there are indications that it is as the year nears its end. There are also indications that there is a closer drawing together of employers and employees through such machinery as works committees, about which we heard much that was satisfactory at the recent meeting of the Society of British Gas Industries. Several gas undertakings have such committees in operation; and the Joint Industrial Council for the Gas Industry have lately issued through the Federation of Gas Employers a model constitution for such committees. Co-partnership still holds its good place in the operations of the gas industry; but it and its beneficent work do not appear to be making much progress in other industries. The history of the year in all these respects is too great for review here; but they all have an important bearing on the position of the gas industry in the matter of costs for plant and materials. The dominant matter of the troubles in the coal industry has already been noticed. In the forepart of the year, too, there was the trouble over railway wages, the settlement of which helped to cause the upward march of railway rates. There was the disastrous moulders' strike, which lasted for some eighteen weeks, wasted much time and money, and seriously curtailed the operations of other industries.

In the gas industry, there have been many strikes—mostly over wages and hours, some because the administrators of the works would not agree to the national settlement of gas-workers' wages, and others because the men disagreed with it. Before dealing with the matter, mention must be made of the strike at the North Middlesex Company's works. The policy of the Board of the Company has always been a perfectly neutral one as to whether or not their employees were members of the Union. The unionist employees demanded that the old non-unionist employees should become members of the Union, or be discharged; and because the Directors would not move one way or the other, the union men (without the sanction of their headquarters) went on strike. The Company received splendid offers of help; and they soon had their works manned again (much to the discomfiture of the strikers) with mostly raw labour, which was not long in getting quite efficient. The lesson was a salutary one; the strikers found themselves among the unemployed.

The question of wages and hours has been a thorny one in the industry. In January the Industrial Court issued their award in the matter of the then latest application for 10s. a week increase, or 1s. 8d. a day or shift increase for daily gas-workers, and 5s. a week or 10d. per day or shift for juniors. The most important feature of the award was that the principle of discrimination as between the size in output of gas undertakings was for the first time recognized in making awards in respect of gas-workers' wages; and increases were stepped accordingly. The datum line was drawn at 100 million cubic feet; and in undertakings with outputs over that line, the workers above eighteen years of age were awarded a further advance of 5s. per week, or 10d. per day or shift; where the annual output was below 100 millions and above 50 millions, the increase was at the rate of 4s. a week, or 8d. per day or shift; in the case of undertakings with an output less than 50 millions, the advance was at the rate of 3s. per week, or 6d. per day or shift. The previous total advance was 28s. 6d. per week, *plus* 12½ p.ct., for all male workers. Thus the addition made the wartime and after advances 33s. 6d., 32s. 6d., and 31s. 6d. for the three grades of works, *plus* the 12½ p.ct. It was stated that the advance would in the case of the Gas Light and Coke Company make an addition of £200,000 to their wages bill, and would cause the total wages of the Company to rise to not far short of 3 millions.

The settlement did not mean peace for any length of time. With April came a demand from the Federation of General Workers for an immediate increase of 10s. a week. A 44-hour week was also sought, in lieu of the 47-hour week, as well as new holiday and week-end conditions of pay. To the main proposals the Federation of Gas Employers could not consent, in view of the financial conditions of the industry; but they offered certain terms on the minor proposals, which were not accepted. A ballot of the gas workers was taken; and, in the result, it was stated that 96 p.ct. were in favour of a strike. But no figures were published to enable one to test how far this represented the actual position; and about it there were grave doubts. The Minister of Labour intervened; and the Joint Industrial Council were again called together. But the Federation of Gas Employers held firm to the position they properly took up—that nothing could be done until legislation had placed the industry in a safe position in regard to its financial basis. Strike notices were postponed until July 3; and it must be acknowledged that throughout the negotiations Messrs. Clynes, O'Grady, Will Thorne, and Hayday showed a reasonable desire to have the matter settled amicably. At a conference of Union representatives at York, the leaders were able to announce that what the Federation of Gas Employers had in mind was that, in respect of the main proposal, subject to the industry's being put in possession of better financial prospects by the passing of the Gas Regulation Bill, they would be willing in the circumstances of the times to concede 1s. per shift or 6s. per week. Soon afterwards a settlement was reached, in which the 6s. figured as the main item. The other terms are well known. But, unfortunately, despite the agreement with the accredited representatives of the men, the extreme elements got the upperhand in some areas, and there were strikes in several towns in the Manchester district (Manchester and Salford being prominent), at Bristol, and elsewhere against a settlement that did not incorporate the full terms sought. Manchester, Salford, and other places were temporarily deprived of gas (much inconvenience being caused) through this piece of unwarranted procedure and the defiance by the men of their leaders. But eventually the men returned to work on the condition that their grievances should receive additional consideration by the Regional Councils and the Federation of General Workers. Then came further conferences, into which we will not now enter. But one point of particular interest to small undertakings was that a step was taken to protect their interests in future by inducing the Union representatives to form immediately a Joint Committee with the Federation of Gas Employers to arrange for the grading of undertakings in the industry. If once a scientific and equitable scheme of zoning and grading can be agreed upon, many difficulties will be eliminated.

But there came a surprise for the Federation of Gas Employers. Although a national settlement had only just been agreed to, a new claim was made for an additional 1s. per shift or 6s. per week for time workers; and this was a concession on the part of the leaders to the disaffection that had occurred in the extremist ranks over the previous national settlement, to which the leaders were parties. Naturally the Employers' Federation would not consent to this new claim, which was altogether unreasonable; and they insisted that the zoning and grading scheme should be dealt with, in order to get on to a proper basis for the future consideration of wage movements. There was ballot and strike talk. But at a conference at Oxford of the Unions concerned, wise counsel prevailed; and the Negotiating Committee were instructed to push on with the scheme of zoning and grading, with the view to arriving at a basis for the future. The work is complex and far-reaching; and it takes time. Good progress has been made; but our last information is that it has not yet been completed. It may be added that the total war-wage advance to gas-workers is 39s. 6d.

One strike that attracted much attention was that at Cheltenham, which deprived the town of gas for five or six weeks. In view of the fact that the concern was being worked at a loss, the Directors of the Company refused to recognize the national agreement. An offer was made that the matter should go to arbitration; but this was declined by the men. Eventually the strike was brought to an end on the Board of Trade issuing the necessary increase of gas charge powers.

UNEMPLOYMENT INSURANCE.

The new Unemployment Insurance Act came into operation. There was a discussion on the subject at the Gas Companies' Protection Association meeting, initiated by Mr. D. H. Helps; and on the occasion, gas undertakings were advised not to apply for exemption under the Act, in

view of the employment conditions offered, and the terms to which they would have to submit. Since then it is learned that gas undertakings requiring certificates of exemption can have them if they have a contract to continue the service of the employees concerned until such time as they will be entitled to a pension or other retiring allowance under a superannuation scheme; otherwise there must be a contract for employment for life. This is an unsatisfactory condition, and therefore unacceptable. Further pressure is being brought to bear upon the authorities in regard to the question.

IN CONCLUSION.

Now we have dealt with the matters that have affected permanently, or more or less temporarily, the affairs of gas undertakings; and the review shows that it has been a momentous year for the industry, and one which has contributed an important chapter to its history. There are many other subjects we should like to have dealt with; but we must be content with a mere mention of a few. There is the satisfactory increase in the gas business of the industry. Railway rates have formed a matter for much discussion; and in the inquiry upon them Mr. S. S. Ogilvie, the Assistant Manager of the National Gas Council, gave good evidence. The subject of gas oil, too, is interesting; and one of the last quotations priced it at 1s. 6d. per gallon net and naked *ex* wharf. There is the liveliness, too, that is apparent in the improvement and standardization of gas appliances. The position of gas stocks and shares has not materially altered in view of the passing of the Gas Regulation Act; but when dividends are restored, we shall see a difference. The proceedings of the gas organizations really deserve more than passing allusion. In this retrospect great prominence has been given to the work carried on by the National Gas Council, in connection with which there have been incidentally mentioned the Institution of Gas Engineers (of which Mr. Thomas Goulden is President), the Gas Companies' Protection Association (of which Dr. Carpenter is now Chairman, in place of Mr. H. E. Jones, who has resigned, through years necessitating the conservation of strength), and the Society of British Gas Industries. All have done valuable work; and especially the various Research Committees of the Institution. The British Commercial Gas Association has continued its high standard of energy; and during the year has given prominent place in its operations to the housing schemes. The National Association of Technical Gas Officials have been active in connection with the salaries question. The Public Utility (Capital Issues) Act, the Corporation Tax, the useful work of the Smoke Abatement Committee, depreciation allowance, and a hundred other topics rapidly cross the mind; but we must decline to be tempted into extending the reference.

As we conclude the glance backward, it is with the feeling that the year, with all its burdens, has its bright parts, and that the work accomplished in it enables us to look forward in a new frame of mind, and with better anticipations for the year 1921 than could be visualized twelve months ago for the year 1920.

Therm Trading Experiences.

The South Metropolitan Gas Company commenced trading on the therm basis at the beginning of the current quarter. Some interesting information as to their methods and experiences appears in a special article in columns almost directly following this. The Company are doing business on the new basis with perfect thoroughness. They are selling therms, and do not call them cubic feet, or apply any other misnomer to them. Things are going along without a hitch; and the office staff, meter readers, collectors (ordinary and slot), and consumers have fallen on to the new lines with good and really surprising ease. It seems to us that the secret of much of this is preparation.

A Big Cheque.

The Imperial Continental Gas Association have received a cheque for £4,740,527 14s. 10d., on account of their claim for proceeds of liquidation of their property in Germany. After the years of adversity, the gratified proprietors are to pocket an interim dividend of 20 p.ct., free of tax, the capital stock is to be reduced and paid-off to the extent of 60 p.ct., and the debenture stock to the amount of 65 p.ct.—the redemption in the latter case being at the rate of 105 p.ct. These and other matters supplied extraordinarily interesting subject-matter for Sir Charles Jessel, Bart., to address the proprietors upon at a meeting on Tuesday of last week. A full report appears in our news columns.

Approaching Retirement of Mr. R. W. Wilson.

It leaked out at the meeting that the Secretary, Mr. R. W. Wilson, will be retiring shortly. He has had half-a-century in the service of the Company, and half that time he has been Secretary, and something more than the official designation conveys. He has been the personal friend of the whole of the members of the Board; and throughout the entire ramifications of the Association's operations, among proprietors and staffs alike, he has won for himself a strong place in their affections—due to distinguished qualifications for the office, one of which is that he has a very human side, and has been frank, fair, and diplomatic in his dealings with men in all positions. He has seen the Association through the recent years of anxiety and uncertainty, into the restoration of the major part of money due and into smoother waters for the remainder of the business. Now that the operations of the great enterprise are to be reduced by the cutting-out of Germany, and will be continued on a smaller scale with only about 40 p.ct. of the old capital, the time is opportune for him to retire. He is entitled to, and deserves, it. The "I.C.G.A." will not seem quite the same thing without him, because——well, Mr. Wilson was Mr. Wilson.

Qualified Boards of Gas Directors.

The Bill which the South Metropolitan Gas Company have deposited for next session may be regarded as a supplement to the 1920 one, which has put the Company on the heat-unit basis, and has given statutory existence to a new system of dealing with prices and profits in place of the sliding-scale, while endowing the workers with a statutory right to participation in defined profits made by charging below the basic figure. Dr. Carpenter and his associates on the Board are not sufficiently satisfied by the financial outlook that the powers obtained in 1916 and 1918 to enable temporary borrowings are much good, and so they are proposing to have the authority for temporary money raising given in those years converted as described elsewhere to a permanent money basis. In pursuit of their progressive policy, the Board have also included a clause which is destined for all time to ensure that the Directors of the Company shall be men technically qualified in some way advantageous to an industrial concern. The clause speaks for itself. This is what it proposes to enact: "All Directors of the Company elected after the passing of this Act shall be persons possessing professional, technical, commercial, financial, or scientific knowledge advantageous to the conduct of gas undertakings. The Chairman of the Board of Directors shall be designated the President of the Company, and the Deputy-Chairman of that Board the Vice-President of the Company; and they shall both be persons having substantial practical or business experience in the production and sale of gas." This assures a gas man—technical and (or) commercial—being at the head of the Board. The Court of Appeal, in a patent case the other week, held that the word "large" was insufficient to show the ambit of the monopoly claimed. Will there in the future be any quarrelling over the word "substantial?" We cannot see that anything is gained by the new titles for the Chairman and Deputy-Chairman. "President" and "Vice-President" for application to the heads of the Directors of a commercial enterprise look like a bit of borrowing from America.

Meter Stamping Fees.

New meter stamping fees come into force on Jan. 1. The working-out of the new schedule is given in our news columns to-day. It is understood that meters bearing the 1920 seal will be charged up on the present scale; and those bearing the 1921 seal at the new scale.

Washing Gas for Benzole.—The manufacture of motor spirit in gas-works was treated of by Mr. S. Nicholls, in a paper read before the Newcastle Chemical Club. Dealing with washing gas for benzole, he said there were several disadvantages attaching to the use of tar. For instance, tar was too viscous at high temperature in winter for scrubbing towers. The tar produced by the carbonization of a ton of coal amounted to only 11 gallons with which to wash (say) 12,000 c.ft. of gas; and the maximum efficiency obtained was 50 p.ct., compared with 80 or 90 p.ct. by oil.

SELLING THERMS.

Practical Experience and Visionary Difficulties.

THE "therm" in the gas business has come to stay; and we welcome it. The "cubic foot" denoted nothing but quantity; the "therm" is expressive of heat and energy. The therm will enable gas undertakings to cultivate public recognition that they are trading in heat and energy; and it will be progressively a great advantage to get people to change their regard for our commodity by looking upon it in a new light. After Orders are issued, or Acts are obtained, authorizing trading in therms, there should be no more speaking in public of cubic feet, and gas should be mentioned as little as possible. We shall be selling "therms;" and the therm is all the Gas Regulation Act entitles gas undertakings to charge for. The "cubic foot" only remains as a convenient item in a simple multiplication sum to arrive at the total number of therms for which the gas undertaking is to charge. For every conceivable reason, therefore, let gas undertakings set out on the new work with enthusiasm, and with the intention of carrying-out the new statutory trading policy or basis (which in our opinion is a good one) with completeness in every detail.

There are some gas men—and men whom we greatly respect, but not their ideas in this matter—who appear to want to compromise or dally with the Act, and to carry it out only in a half-hearted sort of way, because they fancy they see initial worry and difficulties ahead. In our view (if a close following of the matter entitles us to have one), the therm is not a thing that, at the initial stage or at any stage, should be trifled with, nor is the Gas Regulation Act. When under the Act there is authority to charge for therms, then those who drafted the measure naturally expected that it would follow, without absolute enactment, that consumers' accounts would inform them of the number of therms for which they are being charged. The Act does not authorize any half-way or hybrid procedure. As traders in therms, gas undertakings have nothing to be ashamed of; but they will, when the public begin to think and talk in therms, have something of which to be proud, for they will be selling something of a definite value.

EXPERIENCE AND ESSENTIALS TO SUCCESS.

An ounce of good experience is worth infinitely more than a ton of anticipation of difficulty without any solid basis. To apply to a big business such as that of the South Metropolitan Gas Company, the term "an ounce of experience" may seem quite inapposite. The Company have had experience of trading on the heat-unit basis since Oct. 1. Therefore their experience is not of long duration, but is anything but negligible in respect of quantity and diversity. Regarding time, if there are going to be difficulties of a serious nature, they would be felt at the introduction of a new system more than at any other period; but there have been no difficulties. The Chairman of the Company (Dr. Carpenter), the General Manager (Mr. F. M'Leod), and the whole of the officials, before the Company's Bill was framed which brought about the revolution from trading in cubic feet to therms, believed firmly that the change would be a wise and beneficial one. That is the proper spirit. A good belief is the best assurance of success. The first step taken to ensure success was to explain the new system to all members of the outdoor staff who come in contact with consumers, and to get them well-grounded in the meaning of the new basis on which business was to be done. The proper thing is to guard against difficulty by preparation; for it would be a very curious condition of affairs for an undertaking to commence trading in therms, and the members of the staff who come into contact with the consumers not to be in the position to explain the new lines of business.

METER READING AND COLLECTIONS.

The South Metropolitan meter-readers know all the essential features of the new basis of trading; and with practice in making the conversions by the aid of the tabular information with which they are supplied, they are becoming more and more efficient in the new method of working. Already there is hardly any noticeable difference in the number of meters they are capable of reading and registering in a given time, with the therm equivalent duly noted on the meter card. The half-quarter's reading of the ordinary meters was made, quite in regular fashion; and the work went through with extraordinary ease. The men are now proceeding with the quarterly reading, and nothing more is being heard of it than usual. Since Michaelmas the slot collectors have also been working on the therm system, in a perfectly free way; and Mr. M'Leod tells us that he does not believe they have since had more than a dozen letters out of the many thousands of slot consumers whose prepayments have been collected. And the letters were not in the nature of complaints; they were inquiries. This is very satisfactory testimony.

INDEX READERS' CONVERSION TABLE.—FIG. 1.

Every index reader carries with him on his rounds a conversion table. It is in the form of a folding card, 7¼ in. by 5 in., when open. On the grey exterior is printed the wording in fig. 1.

Hints to Index Readers

(For Staff use only).

A "THERM" isn't as dreadful as it sounds. It is only a measure of the heating value of gas, just as the cubic foot is a measure of the volume. Read the meter as you've always done and write down the consumption in cubic feet. Then refer to the table in this card to find out the number of Therms this consumption is equal to and put the figure down in the column provided for that purpose. It only requires a little care when putting down the Therms to get the decimal point in the right place.

EXAMPLES FROM TABLES.

Cubic Feet.	Therms.
3,200	= 17·60
7,700	= 42·35
38,500	= 211·75

Watch the decimal point and always write down both the figures after it, even though the last is a cipher.

When buying 6d. worth of gas in Therms you buy 6d. worth of heating value. That is the chief advantage the consumer gains in buying gas in Therms.—S. M. G. C.

Fig. 1.—Index Readers' Card.

CALCULATIONS

(FOR GAS OF 550 B. Th. U.)

Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.	Cu. Ft. Thous	Therms.	Cu Ft. Thous.	Therms
		5	27·50	10	55·00	15	82·50	20	110·00	25	137·50	30	165·00	35	192·50
.1	·55	1	28·05	1	55·55	1	83·05	1	110·55	1	138·05	1	165·55	1	193·05
.2	1·10	2	28·60	2	56·10	2	83·60	2	111·10	2	138·60	2	166·10	2	193·60
.3	1·65	3	29·15	3	56·65	3	84·15	3	111·65	3	139·15	3	166·65	3	194·15
.4	2·20	4	29·70	4	57·20	4	84·70	4	112·20	4	139·70	4	167·20	4	194·70
.5	2·75	5	30·25	5	57·75	5	85·25	5	112·75	5	140·25	5	167·75	5	195·25
.6	3·30	6	30·80	6	58·30	6	85·80	6	113·30	6	140·80	6	168·30	6	195·80
.7	3·85	7	31·35	7	58·85	7	86·35	7	113·85	7	141·35	7	168·85	7	196·35
.8	4·40	8	31·90	8	59·40	8	86·90	8	114·40	8	141·90	8	169·40	8	196·90
.9	4·95	9	32·45	9	59·95	9	87·45	9	114·95	9	142·45	9	169·95	9	197·45
1	5·50	6	33·00	11	60·50	16	88·00	21	115·50	26	143·00	31	170·50	36	198·00
1	6·05	1	33·55	1	61·05	1	88·55	1	116·05	1	143·55	1	171·05	1	198·55
2	6·60	2	34·10	2	61·60	2	89·10	2	116·60	2	144·10	2	171·60	2	199·10
3	7·15	3	34·65	3	62·15	3	89·65	3	117·15	3	144·65	3	172·15	3	199·65
4	7·70	4	35·20	4	62·70	4	90·20	4	117·70	4	145·20	4	172·70	4	200·20
5	8·25	5	35·75	5	63·25	5	90·75	5	118·25	5	145·75	5	173·25	5	200·75
6	8·80	6	36·30	6	63·80	6	91·30	6	118·80	6	146·30	6	173·80	6	201·30
7	9·35	7	36·85	7	64·35	7	91·85	7	119·35	7	146·85	7	174·35	7	201·85
8	9·90	8	37·40	8	64·90	8	92·40	8	119·90	8	147·40	8	174·90	8	202·40
9	10·45	9	37·95	9	65·45	9	92·95	9	120·45	9	147·95	9	175·45	9	202·95
2	11·00	7	38·50	12	66·00	17	93·50	22	121·00	27	148·50	32	176·00	37	203·50
1	11·55	1	39·05	1	66·55	1	94·05	1	121·55	1	149·05	1	176·55	1	204·05
2	12·10	2	39·60	2	67·10	2	94·60	2	122·10	2	149·60	2	177·10	2	204·60
3	12·65	3	40·15	3	67·65	3	95·15	3	122·65	3	150·15	3	177·65	3	205·15
4	13·20	4	40·70	4	68·20	4	95·70	4	123·20	4	150·70	4	178·20	4	205·70
5	13·75	5	41·25	5	68·75	5	96·25	5	123·75	5	151·25	5	178·75	5	206·25
6	14·30	6	41·80	6	69·30	6	96·80	6	124·30	6	151·80	6	179·30	6	206·80
7	14·85	7	42·35	7	69·85	7	97·35	7	124·85	7	152·35	7	179·85	7	207·35
8	15·40	8	42·90	8	70·40	8	97·90	8	125·40	8	152·90	8	180·40	8	207·90
9	15·95	9	43·45	9	70·95	9	98·45	9	125·95	9	153·45	9	180·95	9	208·45
3	16·50	8	44·00	13	71·50	18	99·00	23	126·50	28	154·00	33	181·50	38	209·00
1	17·05	1	44·55	1	72·05	1	99·55	1	127·05	1	154·55	1	182·05	1	209·55
2	17·60	2	45·10	2	72·60	2	100·10	2	127·60	2	155·10	2	182·60	2	210·10
3	18·15	3	45·65	3	73·15	3	100·65	3	128·15	3	155·65	3	183·15	3	210·65
4	18·70	4	46·20	4	73·70	4	101·20	4	128·70	4	156·20	4	183·70	4	211·20
5	19·25	5	46·75	5	74·25	5	101·75	5	129·25	5	156·75	5	184·25	5	211·75
6	19·80	6	47·30	6	74·80	6	102·30	6	129·80	6	157·30	6	184·80	6	212·30
7	20·35	7	47·85	7	75·35	7	102·85	7	130·35	7	157·85	7	185·35	7	212·85
8	20·90	8	48·40	8	75·90	8	103·40	8	130·90	8	158·40	8	185·90	8	213·40
9	21·45	9	48·95	9	76·45	9	103·95	9	131·45	9	158·95	9	186·45	9	213·95
4	22·00	9	49·50	14	77·00	19	104·50	24	132·00	29	159·50	34	187·00	39	214·50
1	22·55	1	50·05	1	77·55	1	105·05	1	132·55	1	160·05	1	187·55	1	215·05
2	23·10	2	50·60	2	78·10	2	105·60	2	133·10	2	160·60	2	188·10	2	215·60
3	23·65	3	51·15	3	78·65	3	106·15	3	133·65	3	161·15	3	188·65	3	216·15
4	24·20	4	51·70	4	79·20	4	106·70	4	134·20	4	161·70	4	189·20	4	216·70
5	24·75	5	52·25	5	79·75	5	107·25	5	134·75	5	162·25	5	189·75	5	217·25
6	25·30	6	52·80	6	80·30	6	107·80	6	135·30	6	162·80	6	190·30	6	217·80
7	25·85	7	53·35	7	80·85	7	108·35	7	135·85	7	163·35	7	190·85	7	218·35
8	26·40	8	53·90	8	81·40	8	108·90	8	136·40	8	163·90	8	191·40	8	218·90
9	26·95	9	54·45	9	81·95	9	109·45	9	136·95	9	164·45	9	191·95	9	219·45

Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.	Cu. Ft. Thous.	Therms.
40	220	320	1,760	560	3,080	800	4,400
80	440	360	1,980	600	3,300	840	4,620
120	660	400	2,200	640	3,520	880	4,840
160	880	440	2,420	680	3,740	920	5,060
200	1,100	480	2,640	720	3,960	960	5,280
240	1,320	480	2,640	720	3,960	960	5,280
280	1,540	520	2,860	760	4,180	1,000	5,500

FIG. 2.—INDEX READERS' CONVERSION FORM.

On the white inside pages the conversion calculations in fig. 2 re given. This table has been in use during the quarter; and the index readers now go about the work as though it was a matter to which they had long been accustomed.

METER CARD.

The information supplied to the consumers on the meter-index card is shown by the reproduction of the heading—fig. 3.

SLOT-METER READERS' CONVERSION TABLE.—FIG. 4.

The calorific power of the Company's gas is declared to be 550 B.Th.U.; and the charge to ordinary consumers is 10½d. per therm. To prepayment consumers the full charge is 1s. 0½d. To the slot collectors a card is supplied which constitutes both a conversion and a charge table. The front side of the card (which we reproduce) runs from 100 c.ft., or 0·55 therm, 7d., to 5000 c.ft., or 27·5 therms, £1 8s. 1d. The table is continued on the reverse side, in the same manner, from 5100 c.ft., or 28·05 therms, £1 8s. 8d., up to 10,000 c.ft., or 55 therms, £2 16s. 2d.

CONSUMERS' ACCOUNTS.

In rendering accounts to the ordinary consumers, the form shown (back and front) in fig. 5 is now used.

It will be seen that there is no reference to cubic feet upon the face of the account. The first line states so many "therms at 10½d. per therm"—not so many cubic feet at so much per therm! The plan adopted by the South Metropolitan Gas Company is the right one. The therm is being carried right through in the trading work. On the back of the consumers' account, the following information is given, which tells him or her in simple language all about the therm, how to read the gas-meter, and how to calculate the number of therms that have to be paid for. There is no secret whatever about it; and it is not only simply put, but it is extremely interesting, as will be seen by the reproduction.

IN THE OFFICE.

So far as the office work is concerned, therms will not be used in the rental ledgers. The consumption will be entered in the usual way; and the therms represented by the total sales can be easily ascertained by the two factors 550 and 100,000. In making out the accounts there is always the conversion table at the sides of the clerks. It is not denied that there may be a little more work involved; but the difficulties are not so great as some

people imagine. That is the experience of the only Company working the therm system to-day. It all amounts to this, that where there is the will, there is the way.

SOUTH METROPOLITAN GAS COMPANY,

Chief Office—709, Old Kent Road, S.E. 15.

This Card should always be accessible to the Company's Inspector, that he may record the Index at the time he inspects the Meter

*Mr.*_____

DATE	METER READING		CONSUMPTION — THERMS		Declared Calorific Value
	Index	Difference.	Half-Quarter	Quarter	
					550

Fig. 3.—Top of Meter-Card.

SOUTH METROPOLITAN GAS COMPANY

Calculations at 1/0½d. per Therm. (FULL RATE.)

Cubic Feet.	Therms.	s.	d.	Cubic Feet.	Therms.	£	s	d.
Cents.				Cents.				
1	.55		7	2.6	14.30		14	7
2	1.10	1	1	7	14.85		15	2
3	1.65	1	8	8	15.40		15	9
4	2.20	2	3	9	15.95		16	3
5	2.75	2	10	3.0	16.50		16	10
6	3.30	3	4	1	17.05		17	5
7	3.85	3	11	2	17.60		18	0
8	4.40	4	6	3	18.15		18	6
9	4.95	5	1	4	18.70		19	1
1.0	5.50	5	7	5	19.25		19	8
1	6.05	6	2	6	19.80	1	0	3
2	6.60	6	9	7	20.35	1	0	9
3	7.15	7	4	8	20.90	1	1	4
4	7.70	7	10	9	21.45	1	1	11
5	8.25	8	5	4.0	22.00	1	2	6
6	8.80	9	0	1	22.55	1	3	0
7	9.35	9	7	2	23.10	1	3	7
8	9.90	10	1	3	23.65	1	4	2
9	10.45	10	8	4	24.20	1	4	8
2.0	11.00	11	3	5	24.75	1	5	3
1	11.55	11	9	6	25.30	1	5	10
2	12.10	12	4	7	25.85	1	6	5
3	12.65	12	11	8	26.40	1	6	11
4	13.20	13	6	9	26.95	1	7	6
5	13.75	14	0	5.0	27.50	1	8	1

Fig. 4.—Slot-Meter Readers' Conversion Table.

Righting a Gasholder.

In the course of erection, a 2 million c.ft. gasholder which was being constructed for the Southern Counties Gas Company, of Long Beach (Cal.), sank several inches into a soft foundation, causing the heavy mass of steel to lean several degrees to one side; and, of course, before the holder could be filled, it had to be righted. The structure is 176 ft. high, and 146 ft. diameter. The tank holds 4 million gallons of water, weighing 1800 tons. When the holder had completely settled, the lifts were raised and kept in place by powerful hydraulic jacks. Simultaneously with this process, the outer shell was gradually elevated with large wedges placed one under the other. Every time the holder was raised, quantities of concrete were poured underneath it, until it was finally made to stand on a level foundation. The work has now been completed, and the holder filled.

THIS NOTICE TO ACCOMPANY REMITTANCE.

Head Offices:—709, OLD KENT ROAD, S.E. 15.

Office Hours—9 till 4; Saturdays 9 till 1. The Office will be closed on Bank Holidays.

C

Dr. to SOUTH METROPOLITAN GAS CO.

FOR ONE QR.'S SUPPLY OF GAS DUE **CHRISTMAS, 1920,** AS PER CARD

	£	s.	d.
..... *Therms @ 10½d. per Therm* -		,,	,,
Meter Rent - - - -		,,	,,
Gas Stove Hire - - -		,,	
Gas Boiler Hire - - -		,,	,,
Gas Fire Hire - - -		,,	,,
Hire of Lamps - - - -		,,	,,
Hire Purchase:—.....Instalment		,,	,,
Maintenance of Burners - -		,,	,,
Contract Lamps - - -		,,	,,
Sundries as per a/c. rendered		,,	,,
£	,,	,,	

Cheques and P.O. Orders to be drawn in favour of the SOUTH METROPOLITAN GAS COMPANY, *and crossed "& Co."*

ATTENTION IS SPECIALLY DIRECTED TO THE INFORMATION PRINTED ON OTHER SIDE.

You are requested not to pay any money without obtaining an Official Receipt, NOR TO ALLOW ANY PERSON representing himself as an OFFICER of the COMPANY to inspect the METER or FITTINGS, unless he can produce a CARD or BOOK, with the COMPANY'S name engraved thereon. Notice in writing of Removal or Discontinuance must in all cases be immediately given to the Company.

[SEE OVER.

IMPORTANT NOTICE.

The South Metropolitan Gas Company is required by Parliament to charge for gas on the basis of its heating value, and also to declare what that heating value is from time to time.

The present heating value of South Metropolitan gas has been declared at 550 British Thermal Units per cubic foot

A British Thermal Unit is the unit measure of heat in this country, and is the amount of heat required to raise 1 lb. of water 1 degree Fahrenheit in temperature. A THERM is the legal name for 100,000 of such heat units.

Gas is now supplied in accordance with these regulations, and the price is

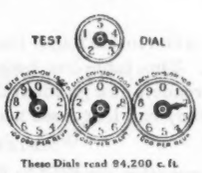
10½d. per Therm.

The calculation of the number of Therms supplied is a very simple matter. Examine the dials of the index of your gas meter.

HOW TO READ THE METER.

Begin at the left-hand dial and set down the lower of the two figures between which the hand on each of the three dials appears, and add two cyphers. This will give you the reading in cubic feet. Subtract the last reading, and the result is the current consumption.

Reading ...	...	94,200
Last reading	...	76,200
Consumption	..	18,000



These Dials read 94,200 c. ft.

Each cubic foot of gas contains 550 British Thermal Units. Therefore in 18,000 cubic feet there are

18,000 × 550 = 9,900,000 British Thermal Units.

Now 100,000 B.Th.U. = 1 Therm.

Therefore 9,900,000 B.Th.U. = $\frac{9,900,000}{100,000}$ = 99 Therms.

Or, expressed as an easily-remembered formula:—

$$\frac{\text{Consumption in cubic feet} \times \text{declared heating value of gas}}{100,000} = \text{Therms used.}$$

SOUTH METROPOLITAN GAS COMPANY,
Chief Office and Showrooms:
709, OLD KENT ROAD, S.E. 15.
Telephone No.: New Cross 2000.

Fig. 5.—Consumers' Account Form.

ELECTRICITY SUPPLY MEMORANDA.

THE Severn barrage and electric power scheme continues to form the subject of comment in the electrical papers; but there does not seem any good prospect of the speculative project getting much farther than its present position on paper.

A Cold Reception.

The first obstacle is that it has no electrical expert backing. The second consideration is that the Water Power Resources Committee have given to it faint praise, and have modified its pretensions from the economic point of view, and, with all the ability on the Committee, they recommend a most searching scientific investigation before any movement is made with it. This shows that the present evidence (if there is any) does not satisfy them. On top of all this comes the economy debate in the House of Commons; and the direction to all Government departments and municipal authorities to economize and to hold over money absorbing schemes that are not imperatively necessary. Now we see the Electricity Commissioners do not wish to be considered as having any paternal interest in the scheme. The repudiation of association in any shape or form is given in the "Electrician." "We are authorized to state," says our contemporary, "that neither Sir John Snell nor any of the other Electricity Commissioners, and none of their staff had any hand in the preparation of the scheme, nor were they consulted as to its details."

Electricity Stations as Hot Water Purveyors.

Mr. A. Hugh Seabrook was always an electrical progressive; he has now turned speculator. In the "Electrical Times," he has suggested to the small station engineer that he should mend the fortunes of his undertaking by becoming a heat merchant as well as an electricity purveyor; and he puts a lot of questions to the (in these days) much harassed individual for him to answer with a view of stimulating his mind. He asks whether it is not a fact that electricity stations have a low thermal efficiency—10 to 17 p.ct. He might have put the 10 p.ct. lower for some of the small stations. Therefore there is some 80 p.ct. and over of heat wasted. Out of every 100 heat units supplied in steam at the engine or turbine stop-valve, not more than 15 to 20 are used by the engine; the balance being rejected in the form of exhaust steam and dissipated in cooling water. The heat rejected at the exhaust—in other words, the heat wasted—represents 50 to 60 p.ct. of the heat of the coal; and this applies to super-stations as well as to the smaller ones. Industrial plants have been working with their heat and power requirements combined—10 to 15 p.ct. of the heat in the steam being turned into power, and the exhaust heat put to good use for factory purposes—resulting in a thermal efficiency of about 50 p.ct., as against the best super-steam-driven station figure of 10 to 17 p.ct. Mr. Seabrook does not believe 20 p.ct. efficiency can be maintained by super-stations year in year out—that is, as ordinarily worked. However, his point is that if industrial plants can reach this efficiency, why should not small central stations suitably situated do the same by supplying waste heat to surrounding buildings for warming, cooking, hot-water supply, &c., and where space is available induce some large heat-using factory to settle in the vicinity and purchase waste heat—thus displacing great quantities of coal at present used for these purposes. Mr. Seabrook has a dig at electrical engineers, for having disregarded the fact that, as a rule, power users require very much more heat than power. The great objection to the proposal is that the small central station cannot afford to speculate in this fashion, Another point is that the centralization of electricity generation is destined in time to wipe-out the small station; and so centralization will largely dissipate the visions of domestic hot-water supply. Again, the demand for house purposes would vary largely with the season, and with different hours of the day. The greatest load of the small electricity station is for lighting; the greatest demand for hot water or steam would be in the day time, including summer, with its short lighting load. More coal, too, would have to be bought, delivered, and consumed by the central station. There are other ways of securing hot water which would be cheaper. It does not look a very taking venture, when the capital that would be required is taken into consideration.

Mr. Pearce's Testimony.

Mr. S. L. Pearce, the Chief Electrical Engineer of Manchester, has been visiting the United States; and, in an interview with a representative of the "Manchester Guardian," he refers to the public steam-heating systems, which they have in a good many American cities, particularly in New York and Detroit. Said Mr. Pearce, "we have done a little bit of warehouse and office block heating in Dickinson Street with exhaust steam, and have tried to make it a bye-product supply from the power station. They started in exactly the same way in the States, but found that, as we found out that, it is next to impossible to run supplies of electricity and steam together, because the loads are not coincident with the times of demand. In America they now have independent steam stations owned and controlled in some cases by the electrical companies; and there is no reason why something of this sort should not also be done in Manchester."

Private Generating Plants.

In the "Memoranda" for Sept. 8, reference was made to the subject of private generating plants—this being a matter in which the gas industry is particularly interested, in view of the custom for gaseous or solid fuel for the purpose. It will be remembered that the Federation of British Industries had in their "Bulletin" discussed the subject in relation to the Electricity Supply Act of 1919. Particular attention was then devoted to the stipulations as to notifying the Electricity Commissioners of the intention to set up private generating stations. The Federation now wish to emphasize the point that the interpretation of the clause is their own, and does not coincide with the interpretation adopted by the Electricity Commissioners. The latter body hold that the clause makes it incumbent on a manufacturer intending to establish a private generating station to notify them before proceeding further, and obtain their (the Commissioners') instructions as to type of current, frequency, and pressure. The Federation think it is hardly necessary to say that such a contention is quite foreign to the spirit of the Act, and is one which manufacturing interests cannot accept. The Federation have considered the question, and legal advice confirms them in their opinion that, until the publication of regulations for an area, there is no obligation on the manufacturer to report the establishment of a private plant, and even after the regulations have been issued it would only be necessary if the type of current, &c., that the manufacturer desired were different from those mentioned in the regulations of the Commissioners. It is further pointed out that it should be clearly understood that, in regard to private generating stations, the duty of the Commissioners is prescribed by the fact that any regulations made by them must not interfere with the economical management of the works. If the regulations do not fulfil this condition, the manufacturer is empowered to erect a station not in accordance with the official regulations. It is, however, suggested that manufacturers should, as an act of courtesy, notify the Commissioners of their intention regarding self-supply; thus assisting them in framing regulations which would be acceptable to manufacturers in the district concerned.

Breakdowns of Large Generating Sets.

The recent crop of breakdowns in electricity systems of cities and towns (to which reference was made last week) supplies one of the best of reasons for manufacturers continuing their private plants, and for others to follow their example. Another instance of an awkward collapse has been furnished by Glasgow; and this is not a testimonial for super-power stations and large generating sets. The breakdown, which occurred at the Dalmarnock power station, was due to the burning-out of the alternator of the first set of the five 20,000 KW. turbo-alternators to be erected there. The accident to this large unit meant a serious disturbance of the supply arrangements. It is stated that the supply of power had to be curtailed for a "few days," and that no electric power was available for industrial purposes between 2 p.m. and 5.30. For a "few days." This is a measure of time vague but sufficiently informative to enable one to realize that it was very serious to industrial establishments, and must have caused grave dislocation of work. Another thing is that one never knows when these interruptions are going to happen; and they have a nasty knack of occurring at most inopportune times. Other fresh breakdowns have been at the Ocker Hill (Staffs.) station of the Midland Electric Corporation for Power Distribution, which necessitated the supply of electricity being curtailed by 50 p.ct. between 7.30 a.m. and 5.30 p.m. Three or four weeks will be required to get the plant in order. Two mills at Todmorden have had to cease operations owing to a breakdown at the Todmorden electricity works. Belfast is still much perturbed over its unpleasant experiences.

Big Loans for Electricity Supply.

The Electrical Development Association have had a luncheon which was apparently intended for boosting-up purposes. This is quite a legitimate thing, and is not unknown in other quarters. Our chief point of interest is that Sir John Snell, the head of the Electricity Commissioners, was one of the guests; and he gave some information as to what the Electricity Commissioners are doing in regard to money matters. It will be seen that the authorization so far means considerable extensions of existing plant as well as the establishment of new power stations of mammoth size. Since May last, it appears, the Commissioners have sanctioned loans amounting to close upon £13,000,000. About half of this has been devoted to large power stations—such as the one at Barton, near Manchester. Some £4,500,000 has been authorized for spending on distribution and transmission; and from £2,500,000 to £2,750,000 has had to be sanctioned for the enlargement of existing generating stations. Sir John hinted that this money would not have been granted if larger stations had been in existence in the neighbourhood. The latter sum will probably be partially lost in future when generating developments take place; but the Commissioners have had to face the alternatives of sterilization or of extending on the old lines. Developments on a bigger scale, in Sir John's opinion, are necessary for the industry; and the Commissioners would be lacking in their duty if they put a stop to the growth which must take place. He foresees a state of affairs coming

when some of the more congested railway lines will have to be electrified; and then, in his view, it will be possible to give supplies to districts and factories which now have to depend on their own private power. He thinks the general co-operation of electricity undertakings throughout the country will help industrial development to a considerable extent. One other point was his reference to the raising of the maximum charges of electricity undertakings. He also spoke of the enthusiasm which the electricity industry has put into the question of the delimitation of the supply areas. In view of this enthusiasm, the Commissioners have felt justified in recommending the Ministry of Transport to drop the Bill which proposed compulsory powers. He intimated that it depends upon the industry itself whether the necessity will ever arise to ask Parliament for such powers. The new Bill which has been introduced he characterizes as a "short, non-contentious measure," which will enable certain urgent points to be dealt with. The Bill was mentioned last week.

A BILL AND ITS MEANING.

THE South Metropolitan Company have been in Parliament frequently the last few years. They were there in 1916, in 1918, in 1920, and now they have deposited a Bill for promotion in the ensuing session. These applications to Parliament are all interlinked. Taken together or separately, they reflect change.

In the first place, the new Bill is a manifestation of how development has necessitated changes of view in the administrative quarters as to the financial outlook. In 1916, the Company obtained power (among other monetary authorization) to borrow £100,000, and further to borrow £500,000 subject—this only applies to the latter sum—to the obligation to repay or redeem within seven years of its borrowing. Two years later (1918), further capital powers were obtained; which included authority to borrow a further £500,000 subject to its redemption within ten years—provision being at the same time made by which the seven years stipulated for under the Act of 1916 and the ten years under the Act obtained in the session of 1918 could be extended by the Board of Trade. It is obvious that in those years the Directors believed there was fair ground for the hope that better financial times were not a great distance off, and that it would meet the current needs of their undertaking to have power to obtain temporary capital. This hope has been forced to recede by developments and the present conditions. The Directors have therefore now decided in effect to ask Parliament to make permanent that which was granted in 1916 and 1918 as temporary. That is all. They are not asking for any capital powers in excess of what they already possess. This is how they propose to effect the desire: It is intended to extinguish the powers as to the £100,000 loan capital in the Act of 1916 and those as to the £500,000 redeemable stock in the Act of 1918. In place of the latter, the Company ask for power to issue £500,000 of further ordinary or preference stock, or partly by the one or other of these modes; and as to the temporary loan under the 1916 Act, they wish to be empowered on the redemption of any of that stock to reissue it without any further authority either as redeemable or irredeemable debentures or debenture stock. The clauses are significant of the change in outlook. It has to be accepted that high costs have come to stay—at all events for a long distance ahead; and so no harm can be done, but trouble may be saved by the conversion as described from the temporary to the permanent state. The accounts of the Company show they are fully justified in asking for these powers in addition to those still unexercised. A few clauses follow which are purely consequential upon these financial changes.

Of course, one cannot talk of finality in connection with legislative matters any more than one can in connection with developments in the industry itself. If finality could be spoken of, then we should be able to mark-out our limits; this is impossible. But it is seen in some of the succeeding clauses that what may be called "finishing touches" are put to certain of the powers contained in the Company's 1920 Act, which transferred business to the heat-unit basis, and did much else. In the first place, it will be remembered that the Lords Committee refused the Company's proposal for a 6 p.ct. minimum for existing ordinary stock, and put it upon a 5 p.ct. basis; while allowing the 6 p.ct. for new issues of ordinary from the passing of the Act. Section 12 of the present Bill is in effect an instruction to the Company to distinguish by separate denominations the existing ordinary stock and that to be issued from now. Section 14 of the Bill points to the discovery of an interesting little snag in clause 15 of the Act of this year. Eight lines down in that clause, it says: "And as if any reference in the said Acts of 1876, 1880, and 1905 to purity or defect in purity *were* a reference to inert constituents or an excess of inert constituents as the case may be." The effect of that innocent looking "were" is to limit "purity or defect" to inert constituents, which is altogether foreign to the policy and practice of the Company. Thus "were" is to be displaced by "included" through the amending clause 14.

Coming to clause 15, there is a proposal to simplify the statement of capital in the accounts. In the Company's 1900 Act they have a schedule prescribed for setting-out the capital statement, which involved giving in detail the premiums, the amount added by conversion, and so on. It is thought the time has come when it would be sufficiently informative if the accounts showed "the amount of the capital and the amount of the loan capital of the Company as from time to time existing, and the extent to which the same consists of ordinary or preference capital or debenture stock or other borrowed moneys." The form proposed is shown in the schedule to the Bill. It leaves out reference to amounts added by conversion and as premiums. It is thought that the shortened statement will be more lucid, and more readily understood by the proprietors, and especially new ones and intending purchasers of stock, as it has no effect upon the investing public. As a matter of fact, there is no sense in putting in the omitted particulars with the dividend reduced in conformity with altered conditions. Besides, there are practically no proprietors of stock in the Company now who were holders of stock before the auction clauses were introduced; and up to the war, there were few (if any) who had not paid premiums for the stock they held. So that, from every point of view, there is no sense or reason in lumbering up accounts with something that is worthless. If the new form of capital statement is allowed, it will answer all purposes and avoid confusion.

In the Electric Lighting Act, 1882, there is a clause (29) which gives power to the Board of Trade to relieve gas undertakers from the obligation to supply gas in certain cases—for instance, if the Board are satisfied that any specified part of a gas-supply area is sufficiently served with electricity, and that the supply of gas in the specified part has become unremunerative. We have never heard of such a case during the past 38 years; but who knows what may happen? We are not anticipating anything of the kind occurring. Nevertheless, no harm can be done, and it may be useful, to have a clause in essence that of clause 29 of the 1882 Electric Lighting Act. The South Metropolitan Company are proposing to adopt such a clause as a protection. It is clause 18 of the new Bill; and it reads:

> If at any time the Board of Trade are satisfied that the circumstances within any part of the limits of supply of the Company are such as to render the supply of gas by the Company therein unremunerative or that it has for any other cause become unreasonable that the Company should be required to supply gas in any such part thereof, the Board may, on the application of the Company, and subject to such conditions as the Board may think fit, relieve by Order the Company from the obligation to supply gas in any part of such limits, and as from the date of any such Order; and so long as any conditions thereby imposed upon the Company are complied with, the Company shall be under no obligation to supply in any part of the said limits specified in such Order. The costs of any inquiry by the Board under the provisions of this section as certified by a secretary or assistant secretary of the Board shall be borne and paid by the Company.

Under present-day conditions of supply and competition, the Directors are apparently of opinion that the Company ought not to be deprived of this protection.

The reconstruction work started by the Company's Act of this year is to be further completed by providing that the Board of Directors shall henceforth be regarded as a committee of experts. This will make available many more prizes for those who have borne the burden and heat of gas-supply duties. The clause which will in future govern the election of Directors reads:

> All Directors of the Company elected after the passing of this Act shall be persons possessing professional, technical, commercial, financial, or scientific knowledge advantageous to the conduct of gas undertakings.
>
> The Chairman of the Board of Directors shall be designated the President of the Company, and the Deputy-Chairman of that Board the Vice-President of the Company; and they shall both be persons having substantial practical or business experience in the production and sale of gas.

There is a good deal to be said for the Chairman of an industrial Board of Directors being something more than a figurehead; and the idea is that technical qualification in that quarter shall be not only essential in the present, but, so far as the South Metropolitan Company is concerned, shall be assured in the future. It is a point which it is thought wise to deal with while the process of reorganization is being carried out. The conditions of the present, and of the future so far as they can be defined from the current outlook, demand the utmost efficiency at the top in the administration of gas undertakings. It is as necessary there to-day as it is in the chief officials; for determination rests with the Board, as some officials have good cause to know when they are suffering from the decisions of false economy.

There are other clauses in the Bill—some model ones, such as the section for the appointment of a Managing Director. Provision is also made to prevent dual payments to the Managing Director. There is another provision as to Auditors. At present three are provided for; but it is thought that two will suffice now, with an option to be exercised by the Directors for an increase to three. It is also provided that the Directors shall determine the remuneration of the Auditors. They are the best judges of the amount and value of the auditing work.

The Bill is a clearing-up and remodelling one; and it will be interesting to watch the fate of the various proposals. It marks continued progressiveness.

PERSONAL.

Mr. J. A. MACLEOD, the Secretary of Messrs. Parkinson and W. & B. Cowan, Ltd., has relinquished that position to devote full time to his duties as a Director of the Company. He will be succeeded as Secretary, from Jan. 1, by Mr. ALBERT J. WEST.

At a meeting of the Institution of Civil Engineers on the 14th inst., Mr. BERNARD F. BROWNE, of the City of Santos Improvements Company, Ltd., and Mr. HUBERT POOLEY, of Leicester, were transferred from the roll of associate members to that of members.

The Directors of Messrs. William Sugg & Co., Ltd., have invited the three principal officers of the Company—Mr. W. G. H. MATTOCK (the General Manager), Mr. J. W. LOFTS (the Sales Manager), and Mr. H. J. WALLER (the Secretary)—to join them on the Board. The gentlemen named have been in the business for periods varying from 33 to upwards of 40 years respectively; and it is anticipated that the step taken will result in closer co-operation between all those responsible for the administration of the business. Mr. ANTHONY A. SUGG, a son of the founder of the Company—the late Mr. William Sugg—has also joined the Board. Prior to the war, on the outbreak of which he volunteered for military service, Mr. A. A. Sugg, who received his training from his father, was engaged in the business for many years; and it is believed that his knowledge and experience will be of considerable value in promoting its welfare.

There was a gathering last Wednesday, at the offices of the Newcastle and Gateshead Gas Company, of the staff and workmen, for the purpose of making a presentation to Mr. and Mrs. THOMAS HARDIE of a silver tea and coffee service, as a token of their respect and esteem. Mr. J. E. Cowen (the Chairman of the Company), who presided, expressed the regret of the Directors at losing the services of so excellent an official. Mr. Hardie was a capable engineer and a faithful servant. The presentation was made by Mr. H. Millington, foreman blacksmith (who has been for over half-a-century in the service of the Company). He referred to the cordial relations that had always subsisted between Mr. Hardie and the staff and workmen. Mr. G. L. Swallow (the Manager of the Elswick Works) presented a gold pendant to Mr. Kenneth Hardie, a son of the Engineer, from the officials and workmen, and said that the happy relations and frankness with which Mr. Hardie dealt with those under him had resulted in the best being drawn from them. Mr. T. P. Ridley (the Secretary and Commercial Manager) and Mr. F. P. Tarrett (Mr. Hardie's successor) also made a few remarks. Mr. Hardie, in reply, said big changes had taken place; and the progress of the Newcastle and Gateshead Gas Company practically indicated the progress throughout the whole of the gas industry.

OBITUARY.

Mr. F. HUE WILLIAMS, whose death occurred last Saturday week at his residence in Epsom Road, Leatherhead, was connected with a number of local undertakings; and in several he took an active interest. He was appointed a Director of the Leatherhead Gas Company in 1883, and became Chairman in 1905. At the time he joined the Board, the Company was small; but Mr. Hue Williams was most energetic in promoting its interests. It was upon his advice that, in 1901, an Act of Parliament was obtained to change the concern from a joint-stock to a statutory company. Mr. Hue Williams was also a shareholder in the old Cobham Gas Company; and, seeing the possibilities of extending the Leatherhead Company's area, he was successful in his efforts to get the Cobham Company taken over by the Leatherhead Company.

BRITISH COMMERCIAL GAS ASSOCIATION.

Executive Committee Report.

The following are some sections of the report of the Executive Committee presented to the General Committee on Wednesday, the 15th inst.

FINANCE.

It is satisfactory to be able to report that, without waiting for the issue of an official appeal for a combined subscription of 5s. per million cubic feet of gas made, to finance the work of the National Gas Council, the Institution of Gas Engineers Research Committees and this Association (which a Joint Finance Committee of the bodies concerned has decided to recommend to the industry), undertakings representing nearly 40 p.ct. of the total output in the United Kingdom have already agreed to subscribe on the proposed revised basis.

From the point of view of this Association, which will benefit by an increase in its receipts of not quite 50 p.ct., it can be certainly said that the revised rate of contribution decided upon is the minimum which would enable the Association to carry on its work for the industry, as even with the increase in income it will not be possible to maintain the volume of direct advertising work at pre-war level.

It is earnestly to be hoped that such undertakings as hitherto have subscribed at less than the full rate will now be able to see their way to contribute to all the co-operative work which is being carried on for the industry, at the agreed figure of 5s. per million. It is also to be hoped that other undertakings which have not heretofore subscribed at all to the co-operative work, or to only one branch of it, will now be persuaded to pay their share of its substantially increased cost.

Every undertaking in the country that is not at present subscribing to the co-operative work of the industry will be approached on this occasion, and the case put to them as strongly as possible. The co-operation of members of the Committee in such a campaign for new and increased subscribers will be welcome. It is hardly necessary to remind them that every undertaking which does subscribe will benefit by the addition to the income of the Association of further contributions from those at present who do not subscribe fully or at all.

HOUSING.

Important points arising out of housing schemes continue to demand and to receive attention. A special memorandum dealing with the financial aspect of the schemes (to which reference was made at the last meeting of the General Committee) has been prepared; but, in view of the fact that the whole question is at the moment under discussion with the Financial Department of the Ministry of Health, the issue of the memorandum has been temporarily deferred.

A deputation from the National Gas Council and this Association is meeting the Accountant General to the Ministry of Health this evening, and the Chairman of the Executive will report verbally to the Committee the result of the meeting. [The Chairman reported that the case for substantial payment by housing authorities in respect of both internal equipment and the provision of mains and services, to enable gas undertakings to supply gas to housing estates on a commercial basis, had been laid before the Ministry, who had promised to give the matter early consideration. In the meantime, gas undertakings should, in their negotiation with housing authorities, see that the terms on which they undertook to supply were such as would not throw a special burden on existing consumers.]

ADVISORY COMMITTEE ON EDUCATION.

The National Gas Council, in conjunction with the Joint Industrial Council, have recently had under consideration the question of the desirability of evolving, with the assistance of the Board of Education, a scheme for the technical, commercial, and general education of employees of gas undertakings throughout the kingdom; and it has been decided to appoint an Advisory Committee consisting of two representatives of each side of the Joint Industrial Council—*i.e.*, employers and workers—and one representative each from the National Gas Council, the Institution of Gas Engineers, and the British Commercial Gas Association, with power to co-opt additional members. The Executive recommend that their Chairman should be elected to represent the Association on the Advisory Committee.

The scheme which has already been drawn up by the Institution of Gas Engineers and submitted to the Board of Education in regard to the education of gas engineers, and a scheme for the education and training of technical, commercial, and other employees engaged on the public service side of the industry, which the Chairman of the Executive outlined at Sheffield and is at present drafting, will naturally be co-ordinated with and form part of the complete scheme for education in the industry, which it will be the work of the proposed Advisory Committee to plan.

The proposed district meetings of commercial representatives for discussion of matters of general interest, and for the improvement of the knowledge of all—the proposal for which was heartily welcomed at the Sheffield Conference—will also, of course, be co-ordinated with the general scheme of education. Arrangements for the holding of such meetings will be referred to the District Committees for consideration at an early date.

DISTRICT CONFERENCES.

Arrangements are being made for meetings of the District Committees early in the New Year, so that the scheme of District Conferences for the year, and the programme to be adopted at each conference, may be considered in good time.

Already, thanks to the assistance of Mr. Beynon, the Chairman and Directors of the Torquay Gas Company have invited the Association to hold a District Conference at Torquay in the spring.

It is suggested that three subjects may be considered by the District Committees for inclusion in the District Conference programme—namely, (1) The new method of charging for gas by the therm, with a view to familiarizing the public with the system and educating the press thereon; (2) housing; (3) the hygienic aspect of gas heating, with a view to a special educative campaign on the subject among medical men and local authorities throughout each district.

DISCUSSION ON GAS *v.* ELECTRICITY.

A letter has been received from the National Association of Supervising Electricians asking the Association to assist them in arranging a debate on the relative advantages of gas and electricity; and the Chairman of the Executive has been requested, and has promised, to represent the industry in the discussion.

NEW METHOD OF CHARGE FOR GAS.

Literature explanatory of the new method of charge for gas by

the therm is in preparation, and samples will shortly be issued to members.

CHILDREN'S COMPETITION.

The annual competition for school children is again meeting with much success. Tens of thousands of children and their parents and friends were interested last year in "Fairy Gas;" and this year all the evidence goes to show that greatly increased interest has been aroused, thanks to the co-operation of many undertakings which are offering prizes locally, and thereby greatly stimulating interest in the competition. The permanent value of this work in popularizing gas is beyond question.

F. W. GOODENOUGH, Chairman of the Executive.

Dec. 14, 1920.

SIXTY YEARS AGO.

[From the "Journal" for December, 1860.]

Lighting Ships with Gas.—"The Times" says that one of Major Fitzmaurice's gas apparatus has been erected in the steam-factory at Woolwich Dockyard, by order of the Board of Admiralty, and has been put into operation experimentally for the purpose of testing its availability for supplying the ships of Her Majesty's fleet and the service generally with gas, in which case one of the apparatus will be fitted in the engine-room of each vessel, to supply the burners fixed in the various compartments of the ship in a similar manner to that on shore. The gas is termed "olefiant" gas, being made from any kind of oil, grease, bones, cocoanut, fat of every description, or even shavings, peat, wood, &c.; and the apparatus may be managed with perfect safety by a mere lad, so extremely simple are its arrangements. The lights were pronounced of a greater brilliancy than the common gas lights, being at the same time free from smoke; and the flame was observed to be of a thicker and stronger quality, although the heat produced was considerably less. The gas will continue in use for a short time in the factory, experimentally, in order to obtain a correct testimony of its superiority, for their Lordships' approval. The Birkenhead Commissioners are also trying the experiment of lighting the cabins of their river steamers with gas, a quantity of which will be carried on board each steamer daily.

Refusal to Supply Gas.—The first judicial proceedings under the provisions of the Metropolis Gas Act have taken place on the refusal by a gas company to supply gas to a would-be consumer until the arrears due by the outgoing tenant were paid. A few instances of similar refusals, which were raked together during the progress of the parliamentary inquiry, proved the most feasible of the alleged grievances that could be adduced against the Metropolitan Gas Companies; and it is a curious fact that the first question which has been tried is a charge of that kind, as the Act specially provides against such a refusal to a *bona fide* customer. The answer given, when the accusation was made before the Committee of the House of Commons, was that demands for arrears were never made on the incoming tenant unless there was good reason to suspect collusion; and the case that has arisen is exactly one of this kind. The tenant, or ostensible tenant, of a lodging-house in Poplar summoned the Commercial Gas Company for having wilfully failed, for seven days after having been required in writing, to provide and lay all sufficient communication, and to furnish a supply of gas, whereby they had incurred a penalty of 40s. for every day after the expiration of such notice during which the failure continued. The case was heard before Mr. Yardley, at the Thames Police Court. On hearing the complainant's evidence, and without calling on the defendants' witnesses, the Magistrate decided that it was a case of collusion, and that the complainant was not, in fact, the real tenant, but had been put forward in that character to demand a supply of gas, while the person in arrear, and whose service-pipe had been cut-off, continued the possession of the house.

Inflammable Mixtures of Coal Gas and Air.—A paper by Prof. W. T. David on the "Internal Energy of Inflammable Mixtures of Coal Gas and Air after Explosion" was communicated by Sir Dugald Clerk to a meeting of the Royal Society. There was given in the paper an empirical law of cooling of exploded mixtures of coal gas and air contained in a closed vessel. As formulated, this was based upon measurements of the heat loss by conduction and by radiation made during the explosion and subsequent cooling of the inflammable mixtures. The heat loss measurements had been applied to the estimation of the internal energy of the gaseous mixtures at the moment of maximum temperature and at various stages when cooling. Curves connecting the internal energy and gas temperature had been prepared for mixtures of various strengths. An examination of these curves indicated that the internal energy during the early stages of cooling was a function of the time after explosion, as well as of the temperature of the gas. The interpretation of this was that combustion was not complete at the moment of maximum temperature, and continued during the early stages of cooling. It was estimated that only about 90 p.ct. of the heat of combustion was transformed into thermal energy by the time the maximum pressure was reached, and that combustion was proceeding for at least 0·25 second after this.

THE METHOD OF VALUATION OF A MUNICIPAL GAS UNDERTAKING FOR LOCAL ASSESSMENT AND INCOME-TAX PURPOSES.

By T. ORR, of Motherwell.

[A Paper read, Dec. 20, before the Scottish Junior Gas Association, Western District.]

The valuation of a municipal gas undertaking for local assessment and income-tax purposes is one of the subjects that has not, I think, been dealt with at any of the meetings of our Association. Its absence may not be due to lack of interest, but rather to the fact that the circumstances of gas undertakings, as regards their capital, the character of the district, the make of gas, the price obtained for gas sold and residuals, vary so much that it has almost baffled the keenest minds to devise or suggest a method of assessment that would bear equally and fairly on all undertakings, no matter how different the circumstances of each. There are no two undertakings similarly situated; and comparisons are almost impossible. The question is one with which every gas manager is at some time or other confronted; and he has then to determine upon some course of action with regard to its operation on the undertaking with which he is connected.

So far as I can gather, there has never been a law specially enacted for rating gas-works. If, when the time comes for your assessment form to be filled up, you are in the hands of a reasonable and experienced surveyor of taxes, it is well for you. If not, you may buckle on your armour and prepare to fight. Unless you understand the subject yourself, and can come to a satisfactory arrangement with your assessor, it is not a very pleasant look-out; for you are obliged either to suffer an injustice or face some heavy expenditure in the shape of lawyer's charges.

When preparing a paper on this subject, one is strongly tempted to quote largely from text and guide books issued by experts in the matter, also extracts from decisions as reported in the technical Press; but I have resisted the temptation—choosing rather to lay aside legal and technical terms and phrases, and put before you in simple language the method adopted at Motherwell for arriving at the local assessment and income-tax valuation. I have divided my paper into two portions.

VALUATION FOR LOCAL ASSESSMENTS.

A comparative statement made out recently in connection with the Motherwell undertaking shows that the amount paid to local authorities for rates and taxes has risen from 2·81d. per 1000 c.ft. made in 1913 to 5·39d. in 1920; in other words, for each hundred cubic feet of gas sold a fraction over one halfpenny is now paid over to town, parish, and county councils. In the light of these figures, I am sure it behoves every one associated with the gas industry to give the matter his special consideration to ensure that the returns are carefully made-up, and that full advantage is taken of any concessions that can be lawfully claimed. I have prepared a model of the local assessment return (shown with specimen balance-sheet), and will go over the items separately, showing the principle whereby we arrive at our figures.

In 1914, the Motherwell Town Council acquired the gas undertaking from the Motherwell Gas Company; and during arbitration proceedings a careful survey of mains and services, meters, cookers, &c., was taken, on which returns our assessable figures are still arrived at by either addition or subtraction. Up to this year the valuation statement has always been made from the statement of accounts of the immediately preceding year ended May 15; but this year the Assessor agreed to bring it into line with the income-tax return to be made-up on the transactions from May 15, 1918, to May 15, 1919. Apart from finance, this step is advantageous in so far as the figures do not require to be prepared so hurriedly, and the various items can be carefully gone over and considered before handing over the return to the Assessor.

The first item in the assessable statement is, of course, the balance from the revenue account. In order that every figure may be clearly understood, a specimen copy of the balance-sheet is shown giving income and expenditure under various headings. The latter are self-explanatory; but I will run over a few of them, pointing out what is included under each.

(*a*) Coal includes carriage and discharging costs.
Other expenditure indicates expenditure connected with manufacture not already classified, such as boilermen's wages.

(*b*) Other expenditure here would be the cost of, say, waterproof coats for the outside staff.

(*d*) Property and income tax is dealt with under a net revenue account. It is wholly a landlord's tax, and should not affect a hypothetical tenant.

(*f*) General establishment charges include items such as petty expenses—*e.g.*, telephone and telegraph charges.
Other expenses include audit fees and any law expenses incurred by the Town Clerk.

(*g*) Residual products may evoke the question, Why are gross figures used instead of net figures? The balance would certainly be unaffected; but I will show the advantage of gross figures later on.
Coke and tar include loading, wages, and in certain circumstances, railway carriage on coke, which of course

RETURN FOR ASSESSABLE VALUE.

	£
Balance from revenue account	14,000
Feu duties	100
Proprietors' taxes	1,500
Siding rent	20
Commission on loans	150
Plus charges	£15,770

* Depreciation—	£
Buildings, £6080 at 2 p.ct.	121
Machinery, £43,210 at 3 p.ct.	1,296
Mains and services, £19,820 at 3 p.ct.	594
Meters, £17,330 at 5 p.ct.	866
Cookers, £13,232 at 10 p.ct.	1,323
Minus charges	£4,200

	£	£
Plus charges	£15,770	
Minus charges	4,200	
		11,570
Less interest on floating capital		2,599
		8,971
Less risks and casualties at 4 p.ct.		358
		£8,613

Calculation of Tenant's Capital.

	£
Total expenses	38,380
Less items disallowed	1,770
	£36,610

Floating Capital.

	£
5-12ths of above	15,254
Meters	17,330
Cookers	13,232
Coal (six week's stock)	5,000
Oxide (at work)	150
Tools and furniture	1,000
	£51,966
Interest at 5 p.ct.	£2,599

* ——	Value at Beginning of Last Year.	Rate of Depreciation.	Depreciation for Last Year.	Written-down Value.	Additional to Capital, less Sales this Year.	Value at end of Present Year.	Rate of Depreciation.	Depreciation.
	£	P.Ct.	£	£	£	£	P.Ct.	£
Buildings	6,000	2	120	5,880	200	6,080	2	121
Machinery	43,000	3	1290	41,710	1500	43,210	3	1296
Mains and services	19,000	2	380	18,620	1200	19,820	3	594
Meters: 8000 at 42s.; 200 at 42s. *plus* 50 p.ct.	£17,330 at 5 p.ct.	..	..	..	..	..	..	866
Cookers: 2500 at 79s.; 400 at 79s. *plus* 25 p.ct.; 200 at 79s. *plus* 50 p.ct.	£13,232 at 10 p.ct.	..	..	..	..	..	..	1323

REVENUE ACCOUNT.

DEBIT.

(*a*) *Manufacture.*		
Coal	£20,000	
Water	100	
Purification	150	
Salary of manager	700	
Wages of stokers	1,600	
Maintenance of works and manufacturing plant	1,900	
Other expenditure	1,000	
		£25,450
(*b*) *Distribution.*		
Wages of meter inspectors	500	
Maintenance of meters	1,000	
Maintenance of mains and services	1,590	
Other expenditure	10	
		3,100
(*c*) *Repair and Maintenance of Cookers*		350
(*d*) *Rates and taxes* (excluding property and income-tax)		
Feu duties	100	
Siding rent	20	
Local rates and taxes	3,480	
Insurance (fire, fidelity, &c.)	100	
		3,700
(*e*) *National Insurance*		50
(*f*) *Management.*		
Salaries of office staff	600	
Proportion of general administration	150	
Stationery, printing, and advertising	150	
General establishment charges	200	
Other expenses	130	
		1,230
(*g*) *Residual Products.*		
Coke	1,500	
Tar	200	
Sulphate of ammonia	2,500	
Spent oxide	50	
		4,250
(*h*) *Miscellaneous.*		
Bad debts	100	
Commission on loan	150	
		250
		38,380
Balance		14,000
		£52,380

CREDIT.

Sale of Gas		£35,000
Residual Products,		
Coke	£9,000	
Tar	2,500	
Sulphate of ammonia	5,500	
Spent oxide	380	
		17,380
		£52,380

is recovered and added to the credit side of the coke account.

Sulphate includes acid and wages, and also railway carriage, which is recovered to a certain extent from the Sulphate of Ammonia Association, and added to the credit side of the sulphate account.

(*h*) Commission on loans is a charge by law agents for introduction of lenders. I will also deal with this later.

The income side does not call for any explanation except that the figures are gross, and, as already stated, include recoverable charges.

The following remarks will elucidate the assessable value return.

Plus charges.—Feu duties, proprietors' rates, and commission on loans are items that would be payable by a landlord, and so, having already been debited in the revenue account, fall to be added to the revenue balance. The total now represents the gross assessable value.

Minus charges.—After the Motherwell arbitration proceedings were completed, a detailed financial statement of buildings, machinery, mains and services, meters and cookers, was submitted to and accepted by the Local Assessor; and, as already stated, these are still the basis figures.

Buildings.—In this class were coal and oxide sheds, retort, purifying, exhauster, sulphate of ammonia, meter and governor houses, paving and drainage.

Machinery.—This included retort bench, condensers, tar extractor, scrubbers, exhausters, tar and liquor wells, purifiers, sulphate plant, gas and water pipes in works, also gasholders and chimney stalks.

Mains.—Under this heading were included drip-boxes and valves, the total working-out at an average value of a fraction over 6s. a yard, while services averaged a fraction under 10s. each.

Meters.—These included stop-cocks, and were valued at an average cost of 42s. each, while cookers (including tradesmen's time and materials) were valued at an average of 79s. each. Since that date 50 p.ct. has been added to the above value for additional meters, and 25 p.ct. and later 75 p.ct. added to the above value for additional cookers.

As you will notice, the rates of depreciation are allowed on the written-down values, thus: For buildings 2 p.ct., machinery 3 p.ct., meters 5 p.ct., cookers 10 p.ct. Whether the rates are sufficient or not is a question I leave over, as the principal object of my paper is to show the method of arriving at the valuation rather than to criticize debatable points.

The final depreciation figures are now brought over, and are termed the minus charges; the difference between *plus* and *minus* charges forming the net assessable value.

We now come to the calculation of tenant's capital. When going-over the balance-sheet, I mentioned that gross figures were

entered in connection with residual products, and that I would explain the reason or justification later. Here is the answer. Interest at 5 p.ct. is allowed on floating capital; and the first item of floating capital is 5-12ths of the expenses less landlord's charges. So it is to our advantage to use the gross figures, as according to our revenue statement, if net figures were used, the balance would be unaltered, but we should lose the benefit of £4250, which goes to swell the proportion of the amount claimed as tenant's capital.

Items disallowed.—Here again the landlord's items are disallowed, and the net figures brought down.

Floating capital.—A tenant on taking over a concern would have to provide sufficient capital to tide him over the period during which his revenue was accruing. The expenditure is divided into twelve equal parts, and five parts give the amount which the tenant would require to provide by way of working expenses. This is another debatable point—some undertakings, I understand, are claiming 6-12ths, or one-half.

Meters and cookers.—These items are brought over from the depreciation statement. It should be noted that only the number of meters and cookers in actual use or at work are allowed—stocks, and meters and cookers at repair, being disqualified.

Stock of coal.—It is generally agreed that six weeks' stock of coal, reckoned on the maximum day's make, is a reasonable amount to keep in reserve. But if the surveyor asks how much coal I actually keep in stock, I answer that an undertaking running short would incur the risk of serious extra expenditure for special carriage and cartage, especially nowadays with labour troubles, strikes, and lock-outs at short notice. The quantity of oxide necessary is also a debatable question. The figures in the return represent the value of oxide at work—no stocks being allowed at all.

Tools and furniture.—These represent what a tenant would require to furnish to enable him to carry on his business—*i.e.*, retort-house tools, shovels, barrows, outside and inside tradesmen's tools, office furniture, photometers, calorimeters, ladders, coin barrow, and all such articles as are necessary in the everyday working of a gas undertaking.

The total amount of the foregoing figures represents the floating capital; and interest at 5 p.ct. is allowed on the outlay, which, in the case before us, equals £2598. This sum is deducted from the net charges, and the balance brought down. On the balance, 4 p.ct. is allowed for risks and casualties which, after deduction, gives the assessable value for the year.

VALUATION FOR INCOME-TAX PURPOSES.

With an income-tax rate of 6s. in the pound, the importance of scrutinizing the assessment form is a serious matter nowadays compared with a pre-war rate of 9d. in the pound. Assessors, like ourselves, realize this; and many items allowed to pass unchallenged on either side when the rate was low are now subject to the most careful scrutiny. As a consequence, the queries that follow the delivery of the annual accounts to the surveyor have a tendency to increase in number.

The laws relating to income-tax, like most others, are based upon justice and fairness; and it therefore cannot fail to be both instructive and practically serviceable for us to know what guiding principles should be in the minds of our local assessors and ourselves when making-up the return. Our ideas have expanded in recent years because of a larger experience; and new conditions have arisen that were not contemplated by a former generation. We are therefore in duty bound to study the lines of development by making it clear to our minds precisely where we may diverge from or disagree with our local assessors in the interpretation of income-tax legislation. Where the tax on profits is considered in conjunction with the repair and maintenance of works, mains, services, meters, &c., it will be generally conceded that it is a wise policy to keep an undertaking in a sound state of repair. Unfortunately, present-day conditions are against us—the cost of labour and material having risen to an abnormal figure; and although it is doubtless most patriotic to pay taxation on as big a scale as possible, it is none the less so to reduce the cost of manufacture to the lowest possible level, provided taxation is not improperly evaded. Both the big things and the little things in a gas department call for careful supervision, and the assessment for income-tax is not the least of them.

The income-tax return is somewhat different from the local assessment return, inasmuch as the latter is made on the direct profits of the revenue account, whereas the income-tax is made-up not only according to profits, but in certain circumstances according to the financial burdens on the undertaking, whichever are the greater. Many disputes have arisen, and still arise, out of matters of book-keeping—such as whether an item of expenditure should be charged against revenue or to capital. These are essentially matters for discussion between trained assessors and lawyers. How difficult it is to decide some points may be illustrated from one case on record—not by any means an isolated one, but one in which the line between liability and non-liability was peculiarly obvious. The City of London Commissioners of Taxes gave their decision on a point where the taxpayer repudiated liability for a charge on certain money called income by the Surveyor of Taxes. The decision was appealed against to the High Court, which held that the Commissioners' ruling was wrong. The case was then carried to the Court of Appeal, which reversed the decision of the Court below, saying that the view of the Commissioners was the right one. Lastly the case came to the House of Lords, which, in its turn, decided by a majority that the Commissioners and Court of Appeal had decided wrongly. Now, when it is considered that the Commissioners for the City of London are chosen from City men of the highest standing, men of world-wide repute in business and the higher branches of finance, and that the Clerk and Legal Adviser was a K.C. thoroughly versed in the Law of Income-Tax, one realizes the responsibility of expressing an opinion on the various controversial points.

In compiling a model income-tax return, I have adopted the same principle as in the Assessable Value Return—viz., refraining from justifying or challenging any of the depreciation rates.

The return of Gas-Works Income-Tax Assessment falls to be made out on Form No. 11 B, Section 2, under which gas-works are assessed on the profits of the preceding year.

Below is a model "Wear and Tear" statement which I think explains itself, and an income-tax return:

WEAR AND TEAR STATEMENT FOR INCOME-TAX PURPOSES.

[*Method in use up to this year.*]

——	Machinery.	Gas-holders.	Mains and Services.	Meters and Cookers.
	£ 43,000	£	£	£
Less chimney stalk . . .	400			
Value at beginning of year .	42,600	7,000	19,000	25,000
Less wear and tear last year .	1,278	210	380	2,500
	41,322	6,790	18,620	22,500
Added during year	1,500	..	1,200	500
	42,822	6,790	19,820	23,000
Rate of wear and tear . .	3 p.ct.	3 p.ct.	2 p.ct.	10 p.ct.
	1,284	203	396	2,300

Total £4183

INCOME-TAX.

Where the burdens are below the profits.

Amount of interest paid to lenders, from which income-tax was deducted .	£9,316	Balance from revenue account	£14,000
Additional taxation. . .	621	Feu duty	100
		Siding rent	20
			£14,120
		Less wear and tear as per statement	4,183
	£9,937		£9,937

Where the burdens are above the profits.

Amount of interest paid to lenders, from which income-tax was deducted .	£9,316	Balance from revenue account	£12,000
		Feu duty	100
		Siding rent	20
			£12,120
		Less wear and tear . . .	4,183
			£7,937
		Sum credited to wear and tear account	1,379
	£9,316		£9,316

In the above second statement for income-tax assessment, it will be observed that the assessable profit (as reduced by the sums for wear and tear) is below the interest paid, and an adjustment is made so that the wear and tear allowance is restricted to leave a net assessment of not less than the interest. The balance is carried forward to a wear and tear account, which is debited or credited each year according to the balance of the burdens and profits. None of the items calls for special remark except the first one in machinery—"less chimney stalk £400." The chimney stalk was originally under machinery, and therefore fell to be included under that heading for depreciation; but the income-tax commissioners in a Motherwell appeal case decided that chimney stalks were buildings, and were therefore disqualified for income-tax depreciation.

In connection with buildings, a new clause is inserted in this year's schedule—viz., deductions are allowed for one-sixth of the annual value of any mills, factories, or similar premises occupied by the owner for the purposes of the concern. Annual value for this purpose is to be computed according to the principles governing the estimation of annual value for the purpose of Schedule A—that is, in general, by reference to the rack-rent at which the premises are worth to be let for the year. The concession is a valuable one. It is not one of those doubtful concessions which take away with the left hand all or the greater part of that given by the right, but is an allowance which (in the words of the Deputy Inspector of Taxes) does not in any way affect the right to charge as an expense the ordinary cost of repairs and maintenance, in so far as the same would otherwise be allowable. In an explanatory note issued by the Motherwell Surveyor of Taxes, he states that the one-sixth allowance will be computed on the annual value of:

1.—Buildings containing machinery and plant, whether the machinery is heritable or movable.
2.—Heritable machinery and plant within buildings.
3.—Movable plant of any description (other than prime movers).

The following are also considered to fall within the description of buildings for which an allowance can be granted: Boiler houses, engine houses, retort houses, purifying houses, chimneys of buildings containing machinery, foundations, weigh-houses, and workshops containing machinery. But laboratories, lavatories, offices, pattern shops, sheds, stores (unless containing conveyors), lifts, and similar accessories are not entitled to the allowance.

The following subjects are considered to fall within the description of heritable machinery and plant: Steam boilers and piping, engines, shafting, and gearing, electric motors, cables, switchboards, &c., for converting electric current purchased into motive power.

The following items would not be, in general, entitled to be included in the one-sixth allowance: Condensers, gasholders, gas-mains, scrubbers, tanks, and tools.

Now there are at least two methods of arriving at the annual value of the buildings. First, by means of certificates furnished by the local assessment authorities; and secondly, by fixing the annual value on a certain percentage of the capital cost of the premises existing on March 31, 1918. In view of the greatly enhanced value of buildings, it may be argued that the value should be taken as the basis and not the original cost. Possibly the authorities would reply that this contention would be given effect to as regards future buildings that may be erected or plant that may be installed, but in granting an allowance for depreciation (for that is what it really is) of existing buildings and plant, their actual cost should form the basis for computation. Another argument arises as to what rate of percentage on the actual cost is fair. But after all, it might be best to adopt the attitude of "sweet reasonableness," as fighting the authorities and endeavouring to get the uttermost farthing may result in defeat.

CONCLUSION.

In conclusion, gentlemen, I have endeavoured so far to put before you a method of arriving at the valuation of a municipal gas undertaking for local assessment and income-tax purposes; and I know I have raised some controversial points. It has often been said that "of the making of books there is no end;" and in like manner one is tempted to say that of the method of arriving at the valuation of a gas-works there is no end. Many side-issues arise apart from actual valuation; such as the pooling of municipal accounts. Is the appropriation of the profits of one department to make-up the deficits of another department justifiable, in order that the total income-tax assessment payable by a corporation may be reduced? When the finance of a gas undertaking has been dealt with fairly and squarely, is not an annual increased valuation for income-tax purposes the true index of prosperity? These are points which may or may not fall within the scope of my paper, but provide at least a matter for discussion.

In connection with the pooling of municipal accounts for income-tax purposes and other objects, while everyone agrees with Sir Roger de Coverley's oft-repeated quotation "much could be said on either side," I would like to bring before you the opinion of an ex-Lord Provost of Glasgow on this question: "Gas is an essential convenience of a modern civilized city; and the citizens are entitled to obtain it under the most convenient and the least onerous conditions possible. Nor have the Town Council of Glasgow been tempted to earn a profit from their gas industry whereby to foster other, but alien, objects. The man who consumes gas in Glasgow and its suburbs is assured that he is thereby called on to pay for gas only, and not for palatial erections, for libraries or art galleries, nor for any other public object, however laudable and desirable. And yet the temptation to apply gas revenues to other than gas purposes was considerable, and the right was indisputable. The Town Council had the precedent and example of several English municipalities, in which surplus gas revenue is systematically applied to other public purposes. The Town Council, moreover, is supplying a widespread population with gas at a cost far below the figure at which these scattered communities could produce gas for themselves, and the City receives no benefit in return from these consumers. In the gas rents the Council had the means and the right to secure and to divert substantial profits to such public purposes within the City as they might deem proper. But they have justly and prudently refrained from exercising this right; and a consumer's gas bill as nearly as practicable represents the cost of the gas as it is consumed."

We are living in a memorable age of our country's history. The war brought about many changes. The finance system of our country has been rudely shaken. The liability for income-tax is not now only confined to capitalists, companies, and corporations, but is associated either directly or indirectly with almost every man, woman, and child, in all sorts and conditions of life, and is likely to continue so for many years to come.

Heavy taxation is one of the legacies of the late war; and while writing my paper, I have been unable to dissociate from my mind the words of Robert Southey in the "Devil's Walk:"

> "And Satan gave thereat his tail a twirl of admiration,
> For he thought of his daughter War and her suckling babe Taxation."

The great gasser of the Constantin Refining Company, of Tulsa, completed a few months ago, is now under control, and the gas is being used for industrial and domestic purposes in the town of El Dorado (Ark.).

COKE-OVEN MANAGERS' ASSOCIATION.

(MIDLAND SECTION)

A Monthly Meeting of the Midland Section of the Coke-Oven Managers' Association was held at the Grand Hotel, Sheffield, on Thursday, the 16th inst., when a lecture on "Low-Temperature Carbonization" was given by Major H. L. Armstrong, of Low-Temperature Carbonization, Ltd. The chair was occupied by Mr. J. A. Davy, of Crigglestone.

In his opening remarks, Major Armstrong dealt briefly with the present position of high-temperature carbonization, which he said could be regarded as a commercial success, both as regards gas-works practice and metallurgical coke-ovens. The position of low-temperature carbonization had been somewhat prejudiced by the extravagant claims of the early workers, and had been further retarded by engineering difficulties, which had to be overcome. Dealing with the products of low-temperature carbonization, he pointed out that, at a temperature of from 600° to 700° C., bituminous coal would give:

> A smokeless fuel containing 10 p.ct. of volatile matter, readily ignitable, and burning without flame; the whole of the heat evolved being therefore radiant heat.
>
> From 16 to 20 gallons of oil per ton of coal carbonized, which in a crude state had been proved to be a good fuel for Admiralty work.
>
> Motor spirit—3 gallons obtained from the gas by washing, *plus* a further 1 gallon from the oil by distillation, making a total of 4 gallons of motor spirit per ton of coal.
>
> From 15 to 20 lbs. of sulphate of ammonia per ton of coal.
>
> From 5000 to 6000 c.ft. of high calorific value gas, available for power purposes, per ton of coal.

The lecturer remarked upon the importance of these products, in view of the present position of the world's oil supplies, and contended that the future needs of the nation demanded that all coal should be put through a process of distillation to extract the valuable oils, and at the same time give a fuel entirely suited to domestic requirements. This, he claimed, had been achieved by Low-Temperature Carbonization, Ltd.; and at the present time a plant was in successful operation, capable of dealing with 50,000 tons of coal per annum. This was about to be extended so as to treat 70,000 tons a year.

After dealing fully with the constructional details of the process, Major Armstrong went on to contend that low-temperature carbonization was now a commercial proposition, and he suggested that in future collieries would sell coalite instead of coal, and that town-gas companies could instal this system alongside their existing processes, and sell coalite to their customers. Power stations and steel works should carbonize first, and make revenue out of their bye-products.

Discussion being invited, many members availed themselves of the opportunity of inquiring more fully into the process, particularly with regard to the nature of the bye-products, the methods adopted in their recovery, and the refining of the oil fractions. Major Armstrong said the oil fraction separated from the water fraction "quite sharp" in the hydraulic main; the specific gravity of the oil being about ·900. The ammonia was recovered in the usual way, and worked-up into ammonium sulphate by the indirect process. The motor spirit was extracted from the gas by absorption with a special fraction of the low-temperature oil; creosote and Scotch oils having been tried without success. The motor spirit was refined on lines similar to those adopted for benzole refining, and gave a product with a specific gravity of ·850.

The next meeting will be held in January, when a paper on "Sulphate of Ammonia Manufacture" will be read by Mr. M. E. Nicklin, of the Wombwell Coke and Bye-Product Company.

Standardized Cookers in the United States.

A seal bearing the words "Constructed in Strict Compliance with Specifications" is to be attached to cookers meeting the requirements laid down by the Committee on the Standardization of Gas-Range Specifications of the American Gas Association. The Committee, in their report for the past year, have drawn up a full specification for manufacture, and, in addition, suggest some changes in nomenclature. What has hitherto been termed a "dirt tray," is now to be called a "burner tray;" while a further recommendation is that so-called "artificial gas" should be known as "manufactured gas." Dimensions and materials are plainly set out; and other matters also are dealt with. The products of combustion from oven burners must be discharged direct into the flue of the range. It should be possible to fully observe the baking-oven burner-flames without opening either the baking or broiling oven doors. The top burners are to be cored castings, and not to have any loose parts. This applies to simmering, as well as to other burners. The gas-outlets are to be drilled ports; and no cone-spreaders are to be used. The distance between the tops of the burners and the bottom of a vessel placed on the bars is to be not less than 1½ in., nor more than 1½ in. The use of baking and boiling boilers in one oven is not recommended, unless the control of these burners is such that they cannot be operated at the same time.

COAL SULPHUR AND ITS CONVERSION IN THE GAS-RETORT.

By ALFRED R. POWELL, of the United States Bureau of Mines.

[A Paper presented, by permission of the Director of the Bureau of Mines, to the American Gas Association.]

Every gas man knows that sulphur is always found in coal in quantities varying from 0·5 to 3 or 4 p.ct., and that when this coal is subjected to destructive distillation a portion of the sulphur finds its way into the gas in the form of hydrogen sulphide or fixed sulphur compounds, while another large portion is retained in the coke. The mechanism of this conversion of the sulphur of the coal into gaseous sulphur compounds, and the conditions which determine the amount and character of these compounds in the gas, has, however, never been studied to any great extent. Such knowledge would be necessary before any possible attempt might be made to modify conditions in the gas-retort so that, for instance, the amount of sulphur in the coke could be decreased, the amount of sulphur in the gas decreased, or the character of the sulphur compounds in the gas changed so as to secure more efficient purification.

Working towards this end, the Bureau of Mines have made a study of the changes which the sulphur in coal undergoes when heated, as well as any secondary changes which might occur in the coal-gas retort. These studies have been made in the laboratories upon experimental coal-gas retorts and upon bye-product coke-ovens.

SULPHUR IN COAL.

Sulphur is now known to exist in coal in three typical forms—pyrite or marcasite, with the formula FeS_2, organic sulphur, the exact chemical composition of which is not known, and sulphates. Fairly accurate methods have been devised for the determination of these various forms.

The organic sulphur content of coal will vary from 0·5 up to 2 p.ct., though it is present in constant proportion in coal from the same general locality. Pyrite, FeS_2, comprises nearly all the remainder of the coal sulphur, and is unevenly distributed through the coal-bed. The coarsely divided pyrite may be removed from coal by washing processes; but the finely divided pyrite and the organic sulphur cannot be removed by any known means. Sulphates are present in freshly-mined coal in almost negligible quantities, but may increase as the coal is allowed to stand, due to the oxidation of the pyrite.

REACTIONS OF COAL SULPHUR DURING CARBONIZATION.

Since the combinations of the sulphur in the coal were known, as well as means for the analysis of these forms, it now was possible to study the changes undergone during the carbonization of the coal. For this study it was impossible to use a gas-retort, since here the heating and consequent carbonization proceeds in zones through the retort cross-section, making impossible accurate temperature control. Furthermore, secondary reactions would occur due to the passage of the volatile products through zones undergoing another stage of carbonization.

Because of these facts, it was decided to use a small tube containing 5 grams of the finely-powdered coal, and so arranged that the volatile products resulting from the carbonization could be swept out as fast as formed. Heat was furnished by an electric tube-furnace capable of close temperature control. The tar was collected on a steam-jacketed cotton filter; the hydrogen sulphide was removed and determined by an ammoniacal cadmium chloride solution with subsequent iodometric titration; and the carbon bisulphide was collected in alcoholic potassium hydroxide. In each case different samples of the same coal were heated to 300°, 400°, 500°, 600°, and 1000° C. In this way, the effect of each stage of the carbonization could be studied. During each run, the temperature was raised at the same rate as takes place in the average coal-gas retort.

Tests were made for the presence of carbon bisulphide in the volatile products, by passing them through alcoholic potassium hydroxide, which was later boiled, acidified, and treated with copper acetate. The formation of a reddish-brown precipitate of copper xanthate indicated carbon bisulphide in the gas. In certain runs, the Referees' total sulphur apparatus was placed at the end to detect any sulphur compounds not determined as above; but no measurable quantities were found.

Analyses of the residue in the tube were made for undecomposed pyrite, sulphate, sulphides—such as ferrous sulphide and calcium sulphide—and organic sulphur, or the carbon-sulphur combination of the coke which will be mentioned later.

Since pyrite is one of the main sulphur constituents of coal, and since mineralogical pyrite may be obtained in a fairly pure form, a study of the pyro-decomposition of pyrite alone was considered important. The decomposition of pyrite at 500° C. was found to be very slow, but proceeded rapidly to completion at 1000° C. The following table gives the changes undergone by the pyrite when heated. The results are expressed in p.ct. sulphur on the basis of the weight of mineralogical pyrite used.

TABLE I.—*Analyses of Pyrite before and after Decomposition at 1000° C.*

	0° C.		1000° C.
Pyritic sulphur	48·52	..	0·00
Sulphate sulphur	0·16	..	0·00
Free sulphur	0·00	..	21·88
Sulphide sulphur	0·00	..	24·24
Sulphur as H_2S	0·00	..	2·56
Total sulphur	48·68	..	48·68

These results show that pyrite decomposes to form ferrous sulphide and free sulphur, according to the following equation:

$$FeS_2 = FeS + S.$$

The formation of a small quantity of hydrogen sulphide in place of an equivalent quantity of free sulphur is accounted for by the presence of a small amount of water vapour or organic matter. As a matter of fact, when the pyrite was mixed with coal, or when hydrogen was passed over it as it was heated, no free sulphur was produced, but the pyritic sulphur divided equally between ferrous sulphide in the residue and hydrogen sulphide in the volatile matter. The ferrous sulphide is stable, and does not evolve sulphur, even at the highest temperatures of carbonization.

Ferrous sulphide produced by the decomposition of pyrite is slightly magnetic, and leaves a faint cloudiness of free sulphur when dissolved. This slight excess of sulphur over that called for by the formula FeS was formerly explained by assigning the formula Fe_7S_8 to the sulphide; but it has recently been shown that this pyrrhotite is nothing but a solid solution of sulphur in ferrous sulphide. When pyrite is heated alone, this excess sulphur is very small in amount; and when the pyrite is heated in the presence of hydrogen, the amount is negligible. For this reason, we are safe in saying that the sulphur existing as pyrite in the coal splits exactly in half; one half remaining in the coke, the other half entering the gas as hydrogen sulphide.

The sulphur distribution of several coals was studied by the laboratory procedure outlined above; but for the sake of space economy, as well as for the fact that all the coals behaved essentially alike, we shall give here only the results on one very high sulphur coal, which had stood some time after being mined, and consequently contained an appreciable amount of sulphate sulphur. This coal was from Morgan County, Tennessee, and analyzed 39·05 p.ct. volatile matter, 7·80 p.ct. ash, and 4·25 p.ct. sulphur. The results are given in the following table:

TABLE II.—*Distribution of Sulphur in Tennessee Coal.*

Values given in p.ct. of original air-dried coal.

—	0° C.	300° C.	400° C.	500° C.	600° C.	1000° C.
Pyritic sulphur	1·75	1·75	1·42	0·31	0·00	0·00
Sulphate sulphur	0·71	0·55	0·44	0 01	0·01	0·00
Organic sulphur	1·79	1·63	1·51	1·70	1·87	1·81
Sulphide sulphur	0·00	0·13	0·44	0·93	0·82	0·84
Sulphur as H_2S	0·00	0·19	0·39	1·20	1·39	1·44
Tar sulphur	0·00	0·00	0·05	0·10	0·16	0·16
Sulphur as CS_2	0·00	0·00	0·00	0·00	0·00	0·00
Total sulphur	4·25	4·25	4·25	4·25	4·25	4·25

From these results on the distribution of the coal sulphur, the various reactions may be deduced. In the first place, we had already proved that pyrite decomposes to form ferrous sulphide and hydrogen sulphide; so that, as the pyritic sulphur decreases, we may assign one half to the "sulphide sulphur" column, and the other half to the hydrogen sulphide column. Furthermore, as the sulphate sulphur decreases, we can assign all of it to the "sulphide sulphur" column. In every case the hydrogen sulphide found is greater than that coming from the decomposition of the pyrite; and since the sulphur of the pyrite and sulphate has all been accounted for, we must look for the source of this hydrogen sulphide in the organic sulphur of the coal.

The small quantity of sulphur found in the tar is present as organic compounds which are probably primary decomposition products of the organic sulphur in the coal. The remainder of the organic sulphur of the coal—that is, the portion which does not decompose to form hydrogen sulphide or the tar sulphur compounds—undergoes a decided change in character at about 400° C. This form of sulphur in the coke has none of the characteristics of the organic sulphur of the coal, though for convenience it has been placed in the "organic sulphur" column of the table. The indications are that it is a very stable union of sulphur with carbon; but it cannot be stated whether this union is physical or chemical.

The reactions given above will explain all the changes observed in the sulphur constituents, with one exception. From 400° up it will be noticed that the sulphide sulphur is not present in sufficient quantity to account for all the sulphides resulting from the decomposition of the pyrite and the reduction of the sulphates. This same disappearance of sulphide sulphur has been noticed in every coal carbonized; and since this sulphur remains in the coke, it must pass over into the carbon-sulphur combination previously mentioned. This rather unusual conversion of the ferrous sulphide into the carbon-sulphur combination may not be of particular interest to the gas man; but from the standpoint of coke manufacture it is important.

It will be noticed that no carbon bisulphide could be detected in the primary volatile products. This bears out the commonly

accepted theory that carbon bisulphide is formed by the action of hydrogen sulphide on red-hot coke, and is not a primary carbonization product. This fact has been brought out previously by the results of low-temperature coking practice, where no carbon bisulphide is found in the gas.

The conclusions to be drawn from the results obtained on primary sulphur reactions are as follows: The pyritic sulphur of the coal divides exactly in half; one half remaining in the coke, and the other half being evolved as hydrogen sulphide in the gas. One-fourth to one-third of the organic sulphur of the coal is evolved in the volatile matter, mainly as hydrogen sulphide. The remainder of the organic sulphur remains in the coke as a very stable carbon sulphur combination. Any sulphate sulphur present in the coal remains in the coke. It can therefore be seen that a larger portion of the pyritic sulphur enters the gas than the organic sulphur, if the primary decomposition reactions only be considered.

Secondary Effects which Influence the Amount and Character of the Sulphur in the Gas.

Fixed sulphur compounds are found in coal gas in quantities ranging from 10 to 15 grains per 100 c.ft. or higher. Carbon bisulphide comprises the greater part of this impurity, though traces of thiophene, thioethers, and isothiocyanates have been found. The gas from low-temperature coking processes contains no carbon bisulphides, neither does that from the laboratory experiments just described. These are essentially processes in which secondary decompositions play very little part.

As further proof that carbon bisulphide is formed by the passage of hydrogen sulphide through red-hot coke, might be mentioned the comparison between horizonal retort coal gas and vertical retort gas. Carbon bisulphide is always found in much larger quantities in horizontal retort gas, where the gas must pass through a highly-heated zone, than in vertical retort gas, where the upper part of the retort is comparatively cool.

One of the most important secondary reactions occurring in the gas-retort is that between hydrogen and the sulphur of the coke. Extended experiments have brought out the fact that a rapid flow of hydrogen through red-hot coke will remove the sulphur in the form of hydrogen sulphide. The rate of reaction between the coke sulphur and the hydrogen seems to be fairly rapid; but equilibrium is reached at rather a low concentration of sulphur in the hydrogen, so that a fairly large concentration of hydrogen is necessary in order to make an appreciable decrease in the coke sulphur.

A study of this reaction as applied to several coals has been made, using the laboratory coking apparatus described earlier in this paper. Hydrogen was passed through the tube at a rapid rate for about three hours; and the comparative result of this treatment, as effecting the distribution of the sulphur, is shown in the following table:

Table III.—*Distribution of Sulphur with and without Hydrogen Upper Freeport Coal.*

Values given in p.ct. of original air-dried coal.

—	Coal.	Without Hydrogen.		With Hydrogen.	
		500° C.	1000° C.	500° C.	1000° C.
Pyritic sulphur	0·47	0·33	0·00	0·01	0·00
Sulphate sulphur	0·07	0·01	0·00	0·01	0·00
Organic sulphur	0·67	0·58	0·66	0·63	0·07
Sulphide sulphur	0·00	0·09	0·12	0·17	0·00
Sulphur as H_2S	0·00	0·17	0·40	0·36	1·11
Tar sulphur	0·00	0·03	0·03	0·03	0·03
Total sulphur.	1·21	1·21	1·21	1·21	1·21

A study of this table shows that two important changes were caused by the passage of the hydrogen. In the first place, the pyrite was caused to decompose at a lower temperature. This would not affect the final results, however, since the pyrite would anyway be completely decomposed at 1000° C. By far the most important effect of the hydrogen was the great increase in the amount of sulphur evolved as hydrogen sulphide, and the consequent decrease in the sulphur of the coke. In this particular case, the sulphur content of the coke was decreased 90 p.ct. by the passage of hydrogen through it.

This action of the hydrogen on the sulphur in red-hot coke brings up the very practical question as to the effect coal gas—and particularly the high-hydrogen coal gas of the final distillation stage—might have on making the sulphur in the gas higher than that indicated by the primary carbonization reactions. Coal gas containing 50 p.ct. of hydrogen was passed through coal in the process of carbonization, at a fairly rapid rate. This coal, when subjected to ordinary destructive distillation, evolved 0·40 p.ct. of its weight as hydrogen sulphide. When hydrogen was passed through, 1·11 p.ct. of its weight in hydrogen sulphide was evolved; while the 50 p.ct. hydrogen mixture caused 0·86 p.ct. of hydrogen sulphide to be eliminated. Gaseous mixtures containing hydrogen, therefore, remove sulphur from red-hot coke, although to a less extent than pure hydrogen.

This secondary reaction between the sulphur of the coke and the gas travelling through it readily explains why lean gas from the later stages of the carbonization contains any sulphur at all. According to the primary reactions, practically no sulphur is evolved after the charge has reached a temperature of 600° C., though a large quantity of gas, high in hydrogen, passes off after the temperature has been attained. This gas, free from sulphur at first, picks up sulphur almost to the saturation point of the gas, as it travels through the hot coke mass. Although the sulphur in the lean gas is very much less than that in the gas from the earlier stages of carbonization, it will often run around 50 grains of hydrogen sulphide per 100 c.ft., which is much more than would be obtained from the primary reactions alone.

In a set of tests at the experimental gas-plant of the Johns Hopkins University by the United Gas Improvement Company, the Johns Hopkins University, and the Bureau of Mines, a study was made of the sulphur of the coke from different parts of the retort. The retort was of the ordinary Ω section; and samples of coke were taken from the bottom, the centre, and the top of the finished coke mass. The highest sulphur percentage was found at the bottom, which was to be expected, since no passage of gas would occur through this portion of the charge, and the sulphur retained in the coke would just correspond to the primary reactions. The lowest sulphur content was found in the centre. This portion would stay cool while the high sulphur gases were passing through, so would not absorb any sulphur. By the time the centre was hot, the gases passing through this portion would be high in hydrogen, and just in the right condition for taking out sulphur from the coke. This explains the low sulphur content of the centre. The top was lower in sulphur than the bottom, due to some cleansing action of the gases passing through the charge, but was higher than the centre. This was due to two reasons—first, that the top was hot when the early high-sulphur gas was passing through, probably causing some absorption of sulphur; and, secondly, that when the high-hydrogen gas did start to pass through, it had already absorbed some sulphur from lower portions of the charge, and therefore did not have a very high absorptive capacity. This test brought out very clearly the secondary action of coal gas in the retort.

A rather detailed study has been made of this action of the gas as it passes through the bye-product oven. Analyses for sulphur in the coke from different portions of the oven have brought out the fact that no decided variation occurs from place to place. This must be due to the slow rate of heating in the bye-product oven, and the consequent diffusion of the gas to every portion. Just at the point where the gas passes up through the stand-pipe, however, the sulphur in the coke is quite noticeably lower, due undoubtedly to the fact that at this point there is a definite current of gas passing through the coke. Nor is this due to the deposition of tar, as some have claimed; for the ash content of the coke from this part of the oven is as high as that from any other part.

The effect of passing bye-product gas back through the oven for the purpose of decreasing the sulphur in the coke has been tried, with some very interesting results. By passing purified gas through the oven at a fairly good rate, and for a good many hours, 15 p.ct. desulphurization of the coke has been secured. Unpurified gas, however, seemed to increase slightly the sulphur in the coke. All of these practical tests have been cited to prove the existence of this secondary reaction between the sulphur of the coke and the gas.

Even after the gas leaves the retort, many changes in its sulphur content occur. Most important among these is the removal of part of the sulphur by the ammoniacal liquor. This decrease in the sulphur content of gas between the retort and the purifiers is well understood by gas men, and need not be entered into here in detail.

Conclusions.

Sulphur occurs in coal in the form of iron pyrite, organic sulphur, and small amounts of sulphates.

When the coal is heated in the gas-retort or the bye-product oven, the following changes in the sulphur of the coal occur.

(*a*) The iron pyrite decomposes; one half of the pyritic sulphur remaining in the coke in the form of ferrous sulphide, and the other half passing off in the gas in the form of hydrogen sulphide.

(*b*) A portion of the organic sulphur is evolved in the gas as hydrogen sulphide, a small part goes into the tar, while the remainder, which is generally the majority of the organic sulphur, is fixed in the coke as a very stable carbon-sulphur combination, which may be chemical or physical.

(*c*) Any sulphate present is reduced to sulphide, and remains in the coke.

Secondary reactions which occur as the gas passes through the hot coke bed are very important in determining the sulphur content of the gas.

(*a*) Carbon bisulphide is formed by the action of hydrogen sulphide on the red-hot coke, and is highest where longest contact of the gas with the hot coke mass is prevalent.

(*b*) The hydrogen of the gas takes sulphur from the hot coke as hydrogen sulphide, until a certain saturation limit is reached. This secondary reaction causes the hydrogen sulphide content of the gas to be somewhat higher than the primary reactions would call for.

Masonic.—At the last meeting of the Murdoch Lodge, No. 3480, Bro. F. Jervis was elected Worshipful Master for the ensuing year.

THE PROBLEM OF THE GAS-TURBINE.

At a Meeting of the Barrow and District Association of Engineers, Mr. C. E. BEARDMORE read a paper upon the "Problem of the Gas-Turbine," in the course of which he said that there is no immediate prospect of the gas-turbine becoming a commercial success.

After dealing exhaustively with the technical considerations which led him to this conclusion, the author gave detailed descriptions of the various gas-turbines. Some of these were projected only, and were never constructed; others were built and actually operated, but with low efficiencies. He described a gas-turbine patented in Germany in the year 1872. It was called a "Fire Turbine," and was designed to compress to about 7 lbs. above atmospheric pressure. Afterwards the air was heated by passing through tubes with the fire on the outside. This was not designed for internal combustion. It was interesting to note the similarity to the Parsons turbine, though it is probable that it never worked.

In describing the Armengand and Lemale turbine, Mr. Beardmore stated that the combustion chamber was lined with carborundum, and the nozzle was kept at a working temperature by means of a water-jacket. The water, after being heated in the jacket, passed into a flash boiler; and the steam generated gave additional power, and tended to keep the blades from being overheated. The excessively high temperature, combined with the action of the steam, caused rapid corrosion of the blades. The latest Lemale gas-turbine was to give 300 H.P. The efficiency of the compressor was estimated at 65 p.ct.; and the turbine was supposed to have generated twice the power required to drive the compressor. Mr. Beardmore thought the results could not be so good, unless an extra large amount of steam were used. A so-called "gas-turbine" of this design could be developed in such a direction that it could ultimately become practically a steam-turbine with a flash boiler. He thought this was the explanation of many good results obtained.

Speaking of the gas-turbine invented by Dr. Nikola Tesla, the author said the air and gas were taken into the combustion chamber through a "valvular conduit," which allowed the gases to flow in one direction and intercepted the flow in the other direction. After the first explosion, the pressure in the combustion chamber rose and fell automatically, which action drew air and gas in, and blew hot gases out. The hot gases were blown between thin discs, which took the place of turbine blades. He thought it would be necessary to make the "valvular conduit" of some metal; or the intense heat would destroy it in less time than it would destroy turbine blades. He believed it quite possible to get a pulsating action in the manner claimed, but that the mean effective pressure would not be very high; and blowing hot gases between discs would be a very inefficient method of transforming their energy into useful work. If it was a fact that this turbine worked at all, he was inclined to think that the efficiency must have been very small.

The most successful gas-turbine yet invented was the "Holzwarth," named after the inventor. Mr. Beardmore witnessed some trials of this turbine in July, 1912. It had ten explosion chambers, placed in a circle, and kept cool by means of water-jackets. Each chamber was fitted with a gas inlet-valve, an air inlet-valve, and an explosion valve; and ordinary high-tension sparking plugs were fitted to ignite the charges at the proper time. The turbine, which was above these chambers, had two rows of blades, and worked on a vertical shaft. The exhaust gases passed through a steam generator on the "contraflow" principle; and the steam generated was supposed to be sufficient to work the auxiliary machinery by means of a steam-turbine. Ordinary water gas was used at the trials. The time between the explosions was about 1½ seconds; and it was arranged that the impulses came as nearly diametrically opposite as possible, to balance the forces on the wheel. His valves were worked by means of compressed oil; and the timing had to be regulated very carefully to get good results. The turbine was originally designed to give 1000 H.P.; but owing, as the inventor claimed, to the nozzles and blades being made too small, it only gave 220 H.P.

In conclusion, Mr. Beardmore said that the only gas-turbines which had shown any signs of being at all successful were those depending very much on the help of steam. He thought that there was practically no hope of the gas-turbine ever becoming a successful rival to the Diesel engine, either in the matter of first cost or as regards thermo-dynamic efficiency.

Mr. William A. Sharpe, of Messrs. Sharpe, Pritchard, & Co. left property of the value of £37,819 gross and £33,286 net.

It has been decided to establish an engineers' social and business club in Central Birmingham. It will be conducted much on the lines of the Manchester Engineers' Club, and will be open to civil, electrical, gas, chemical, and mechanical engineers, as well as metallurgists, architects, &c., connected with the engineering and metal trades. Excellent premises have been obtained; and a lecture-room will be provided for use by engineering and allied associations. A company is being formed with a capital of £10,000. Alderman J. H. Lloyd (the Chairman of the Birmingham Gas Committee) is one of the Vice-Presidents; and Sir Hallewell Rogers, M.P., is President.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Gas Accounts and the Therm Charges.

SIR,—With reference to Mr. Topley's letter respecting the form in which consumers' accounts should be rendered on the therm basis, I regret to find that the matter has not been taken up in your "Correspondence" columns. Personally, pressure of work precluded my writing upon the matter; but I endorse all your remarks appearing in the last issue of the "JOURNAL."

It would probably be a good method for the first few quarters to state shortly, at the back of the account, the fundamental principles of the Act, together with illustrated calculations as to the new charge. The account should show the consumption in cubic feet, as now obtains; but, in addition, full particulars would be given respecting the conversion, the price per therm, and the resultant amount.

As I suggested some time ago in your columns, such a matter as the one under consideration might usefully be discussed at district meetings of gas accountants, with a view to a uniform procedure being adopted for the whole of the gas undertakings.

PROVINCIAL.

Dec. 21, 1920.

A Criticism of Vertical Retorts.

SIR,—In the course of a discussion following the presidential address recently delivered to the Yorkshire Junior Gas Association, by Mr. George Dougill, of Heckmondwike, Mr. R. N. Webb, of Leeds, contributed a few rather clumsy adaptations in the way of "experiences" in carbonization; he also made unworthy comparisons.

He is reported as saying: "The worst coals were sent to the horizontal retorts, and the best to the verticals." Are we to understand that the coal control, before allotting coal to any particular place, first inquire whether vertical retorts are in use; and if this is the case, order a better quality than would be allowed for horizontals? Also "he understood that the intermittent retort could not carbonize slacks in any way comparable in cost with the carbonization of best coals." And, further, "they [verticals] had to increase the heating when poor coal got into the retort."

Apparently, Mr. Webb has no personal experience, and therefore relies on what he has "understood" by and through another party.

For 35 years I have worked, studied, and been deeply interested in all the ramifications of carbonization—from air-inlet to the outlet of the hydraulic main; and irrespective of the type of retort used, I have always found that, if practicable, the heats must be raised "when the poor coal gets into the retort." I know of no type so well off as verticals for even the best coals, and certainly nothing to equal them in dealing with poor qualities. Gas coals are like horses on a race-course. Some gallop, others trot, some only walk or will not budge.

Whatever Mr. Webb may "understand" to be good, or condemn as bad, experience has proved that the intermittent vertical retort is the best for almost any quality of coal. The maximum heat is at the largest sectional area, and graded upwards to correspond with the taper and diminishing area. This ensures uniform penetration throughout the whole length of the charge. Bulk charging and discharging, with a suitable taper of retort, need no special selection of coal. More important, the intermittent vertical is, to all intents and purposes, a low-temperature process, in that the heat penetrates from the circumference to the centre, with equal transmission from all points of the sectional area—an impossibility with inclined or horizontal retorts.

All intentions are damaged by publicly giving vertical retorts a dose of poison, and concealing the administration to horizontals of an antidote for a suicidal dose of precisely the same poison.

Dec. 21, 1920. THOS. SETTLE.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Dec. 22.]

Nos. 35,016 to 35,648.

CARPENTER, C.—"Plant for manufacture of gas." No. 35,334.

CORRALL, A. C.—"Gas, &c., furnaces for heat treatment of metals." No. 35,578.

CROXON, W. C.—"Apparatus for controlling supply of gas to burners, &c." No. 35,435.

GOODRIDGE, A. J.—"Apparatus for clearing interior of ascension-pipes of coal-gas retorts." No. 35,567.

LEASK, H. N.—"Purification of air and gas." No. 35,646.

MASCHINENFABRIK AUGSBURG-NÜRNBERG AKT.-GES.—"Gas-holders." No. 35,320.

MILLER, A. J.—"Tubular burner for gas heating." No. 35,387.

MURRAY, A.—"Unloading-means for multi-stage compressors for air or gas." No. 35,473.

OWEN, O. H.—See Goodridge. No. 35,567.

PETTER, P. W., and PETTERS, LTD.—"Gas-engines." No. 35,453.

PLATSCHICK, B.—"Regulating-valve for gas." No. 35,067.

SLATINEANU, E.—"Catalytically obtaining reactions between a gas and another substance." No. 35,461.

SOC. L'AIR LIQUIDE (SOC. ANON. POUR L'ETUDE ET L'EXPLOITATION DES PROCÉDÉS G. CLAUDE).—"Direct synthesis of ammonia." No. 35,354.

STAPLES, C. W.—"Gas-meters." No. 35,419.

TRENT, W. E.—"Treatment of carbonaceous materials." No. 35,332.

TULLOCH, T. G.—"Gas-producers." No. 35,220.

WEBER & CO. GES. FÜR BERGBAU, INDUSTRIE, UND BAHNBAU, W.—"Plant for separating coke from waste fuel." No. 35,079.

WILKES, A. H.—"Gas-heated radiators." No. 35,131.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Public Utility Companies (Capital Issues) Act.

Copies were presented of reports on applications to the Board of Trade under the Public Utility Companies (Capital Issues) Act, by the Braintree and Bocking Gas Company, Ltd., the Felixstowe Gas Light Company, and the Waltham Abbey and Cheshunt Gas and Coke Company.

Housing Schemes and Smoke Abatement.

Major HAMILTON asked the Minister of Health whether he had accepted the conclusions of the Committee on Smoke Abatement; and, if so, whether he would explain why in Sheffield and elsewhere contracts for thousand of houses were being approved by his Department without these conclusions being specially brought to the notice of the local authorities concerned.

Dr. ADDISON replied that he had circulated copies of the interim report of the Committee to all local authorities, with a memorandum recommending consideration of the various substitutes suggested for the open coal fire, where these could be economically adopted. The report had also been brought to the notice of the Housing Commissioners. He understood that, in the case of Sheffield, the Housing Commissioner had been in touch with the local authority, and that the Council were considering the report with a view to the possibility of taking action in accordance with the suggestions made.

Wet Carbonizing, Ltd.

Mr. HOGGE asked the Prime Minister at what date the Government made a grant to Wet Carbonizing, Ltd.; what was the amount of the grant and on what terms; and for what purpose was it made.

The PRIME MINISTER replied that he was informed that no grant had been made to the Company. In the summer of 1917 certain expenditure was incurred by the Company on behalf of the Government in connection with the scheme for the erection of a factory in France for making peat briquettes for the use of the forces in the trenches. This expenditure, amounting to about £10,000, was advanced by the War Office.

Mr. BOTTOMLEY asked the Prime Minister whether the British Government was a creditor for £200,000 of the Company, stated at a meeting called for the purpose of winding up to be without assets, and, if so, in what circumstances was this obligation incurred.

Mr. BONAR LAW, who replied, said Wet Carbonizing, Ltd., guaranteed the due fulfilment of a contract by Lochar, Ltd. (one of their subsidiary companies), to purchase from the Government the Ironhirst Peat Fuel Factory, near Dumfries, which was established during the war for the supply of peat briquettes to the Army. The agreed price was £370,000; but unfortunately these companies had been unable to raise the additional capital required to enable the purchase to be completed. Arrangements were now being made to dispose of the factory elsewhere; but the Government could claim on Wet Carbonizing, Ltd., for any difference between the amount realized and the price referred to. To this extent the Government were creditors of Wet Carbonizing, Ltd.

Quality of the Gas Supply in London.

Lieut.-Commander KENWORTHY asked the President of the Board of Trade whether his attention had been drawn to the inferior quality of gas supplied by certain gas companies in the London area for illuminating and heating purposes.

Sir P. LLOYD-GREAME, who replied, said the reduction of the quality of gas in consequence of the coal strike gave rise to some complaints by consumers; but he had no grounds for believing that at the present time the quality of the gas which was being supplied in the London area was generally unsatisfactory. Applications had already been received from most of the companies in this area for Orders under the Gas Regulation Act, 1920, and were being dealt with by the Board of Trade. When these Orders were made, charges for gas would be placed on a new basis, which would fully protect the interests of consumers.

Proposed Granton Gas-Works Extension.—As reported in the "JOURNAL" for July 7 last [p. 37], the Engineers to the now defunct Edinburgh and Leith Gas Commission recommended that, owing to the lack of storage accommodation, steps should be taken to provide an additional gasholder and tank, at a cost of from £125,000 to £150,000. The Commissioners decided that the matter should stand over for later consideration. On the 22nd inst. the subject of constructing the tank, at an estimated cost of £60,000, came before the Edinburgh Town Council, when it was resolved to delay consideration of the proposal.

British Ammonium Company.—At the statutory meeting of the Company, Dr. F. H. Bowman, F.R.S.E. (the Chairman), said the whole of the foreign patents had been sold to a powerful syndicate on terms of the very greatest advantage to the shareholders. In addition to this, arrangements were being entered into with some of the largest producers of sulphate of ammonia in the kingdom, who were prepared to put down works under the Company's supervision at their own expense, and to pay a very substantial royalty on all products made under the process. When the shareholders remembered that this process could, and would, be applied to all gas-works who were making sulphate of ammonia, and to collieries and steel-works who used coke-ovens and recovery plant, they could easily understand the importance of the process and the great value of the patents acquired. The process was based on the most recent researches in physical chemistry. The plant was as simple and inexpensive as that of the ordinary gas-works, and could be worked by the same unskilled labour under ordinary supervision, and would in the future form a necessary auxiliary to such works. In addition to the production of sulphate of ammonia, the process was equally applicable to the making of all salts of ammonia and of intermediate products for synthetic dyes and explosives.

MISCELLANEOUS NEWS.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

Payment on Account of Liquidation of the Property in Germany—Dividend Distribution from Special Reserves—Return of Surplus Capital.

An Extraordinary General Meeting of the Proprietors was held on Tuesday of last week, at Winchester House, Old Broad Street, E.C.—Sir CHARLES J. JESSEL, Bart., presiding—to consider proposals, and pass the necessary resolutions, in regard to a distribution of the Association's surplus assets arising out of a payment by the British Government of a sum on account in respect of the liquidation of the Association's property, rights, and interests in Germany.

The SECRETARY (Mr. R. W. Wilson) read the notice calling the meeting.

ILLNESS OF THE DEPUTY CHAIRMAN.

The CHAIRMAN: Ladies and gentlemen,—I regret to say that our Deputy-Chairman (Sir Arthur Lucas) is not able to be present to-day. He was struck down lately with a severe attack of influenza and bronchitis; and his medical adviser declined to allow him to come out to-day. He asked me to express to you his regret; and I am sure you will join with me in wishing him speedy and entire recovery.

A CHEQUE FOR £4,740,527.

Faithful to the promise that proprietors should receive information as soon as any money was received on account of the Association's liquidated assets in Germany, and be called together to decide as to its disposal, notices calling this meeting were sent out on Nov. 30, and were in the hands of many proprietors on the evening of that day. When it is stated that, having had no previous advice of the payment, we were unable to fix a date for the meeting, or hire a place in which to hold it until the cheque was in our hands, this may well be considered a smart piece of work on the part of our office, and reflects credit on our Secretary and Registrar. On the morning of Nov. 30 we received, from the Controller of the Clearing Office (Enemy Debts), a letter, dated the previous day, covering a cheque in the Association's favour for £4,740,527 14s. 10d., "on account of your Company's claim for proceeds of liquidation of their property in Germany." The Controller added *inter alia*: "By accepting payment of the within-mentioned sum, your Company will not prejudice their right to claim compensation for damage to their property under Article 297 (E)." Of course, this means 297 (E) of the Peace Treaty. In anticipation of the receipt of money on account of our claims, an account entitled "Imperial Continental Gas Association Liquidation Account" had been arranged with the Bank of England; and this account was promptly opened by the payment into it of the before-mentioned sum of £4,740,527 14s. 10d. This cheque for £4,740,527 14s. 10d. does not represent the full amount credited by the German Clearing Office. The full amount was £4,764,937 8s. 7d., less commission payable to the Clearing Office (Enemy Debts), equal to 0·51 p.ct., £24,409 13s. 9d.; making a net sum of £4,740,527 14s. 10d. I need hardly say we were agreeably surprised at the low rate of commission charged. Under the Order in Council of Oct. 24, 1919, section VI., it was made "lawful for the Clearing Office to deduct from any sum payable by the Clearing Office to a creditor such commission not exceeding 2½ p.ct. of the amount payable as may be fixed by the Clearing Office." On a previous payment of £181,000 odd by the Clearing Office (to which I shall refer later on), 2½ p.ct. commission was paid. The difference between the actual rate now charged and 2½ p.ct. represents a saving of no less than £94,714.

THE MONEY EARNING INTEREST.

The next important question was the employment of the money so that no loss of interest should occur until it was required for ultimate distribution. As soon as the money was paid in, I attended personally at the Bank, and arranged for a special allocation of three months 6½ p.ct. Treasury Bills from Nov. 30 to the amount of £4,000,000; and I purchased in the open market Treasury Bills maturing from Feb. 1 to 5 to the amount of £750,000. I also arranged a loan of £20,000 at 6½ p.ct. until Jan. 3, and also the repayment of an overdraft of the Brussels establishment of frs. 2,000,000, which cost £36,832 8s. 3d. Thus, with the exception of the comparatively small sum of £6073 15s. 1d., the whole of the £4,740,527 14s. 10d.—the amount of the cheque received from the Clearing Office—was employed without the loss of a day's interest, which at 6½ p.ct. per annum represents the useful amount of £840 per day.

THE PROPOSALS OF THE BOARD.

The agenda of to-day's meeting comprises two proposals by your Board of Directors:

(1) An interim dividend to be paid out of profits accumulated from the workings of past years, upon which income-tax has been paid at the rate of 9½d. in the pound.
(2) A return of capital.

I will take these seriatim.

A DIVIDEND OF 20 P.CT., FREE OF TAX.

By our 1916 Act, section 11, the Board have full power to distribute, by way of interim dividend, such sums as they think fit from ascertained profits. Therefore, we have passed a resolution before we came here to-day to pay an interim dividend of 20 p.ct., free of tax. As, however, we were going to consult you with reference to the repayment of capital stock, we thought we should like to have your approval of the course upon which we have decided. As I say, we have resolved to declare an interim dividend of 20 p.ct., free of income-tax, on the present capital stock of £4,940,000, to be paid to the proprietors as soon as the dividend warrants can be made out.

The Board, in fact, urged me to make arrangements to pay this dividend as soon as possible after to-day. Unfortunately, we did not feel justified in making the payment until we were assured by the revenue authorities that we could safely make it payable free of income tax. Anticipating this several months ago, I instructed the Secretary to apply to the Surveyor of Taxes, and ask him if we could safely do this. The matter was eventually referred by him to higher authorities. Day after day passed without our hearing anything of it; and it was only yesterday that we got a decision from Somerset House to the effect that this dividend could be paid free of income-tax. In consequence of this, we have not been able to get the dividend warrants ready; and it will necessarily take some days before they can be printed, checked, and ready to send out. But I do not anticipate for a moment this will be later than Jan. 10. As the Association paid tax at the average rate of 9½d. in the pound upon the profits which it is proposed to distribute, several knotty points will probably occur to shareholders in connection with the income-tax question. I think it well to let you know that we have anticipated matters, and have obtained the following rulings from Somerset House:

(1) The shareholder will have to regard the dividend as income for the fiscal year in which it is received.
(2) In making a return of total income for the fiscal year 1920-21, the shareholder will have to return, as an already taxed dividend, the gross dividend. To ascertain the gross dividend, the tax must be calculated at 6s. in the pound—the rate in force during the current fiscal year—although the Association has actually only paid at the rate of 9½d.
(3) Similarly for the purposes of super-tax—I hope you are among the 41,000 people who pay super-tax [Laughter]—the gross dividend must be regarded as though tax thereon had been borne at 6s. in the pound, and not 9½d.—that is to say, you will have to add three-sevenths.
(4) Where shareholders are entitled to claim exemption from income-tax, the actual position is not at present ascertained, as the Inland Revenue Authorities were unable to give an immediate ruling. It is obvious that such shareholders can claim a refund of tax at 9½d. in the pound; but there is a possibility that they may be able to recover tax at the rate of 6s. in the pound—this being the logical conclusion which would be arrived at from the before-mentioned ruling as to the method of ascertaining the gross dividend. This point will be decided when the individual shareholder who is entitled to exemption submits his claim to the Inland Revenue Authorities.

I wish him joy of it. I should say also by using only funds which have been provided from revenue, all difficulties between trustees and beneficiaries as to what is capital and what is profit, as far as the proposed distribution is concerned, are avoided.

THE POSITION OF THE CAPITAL.

Now I come to the question of the return of capital. The Association's capital comprises two items:

Capital stock	£4,940,000
Debenture stock outstanding	£1,149,640
The amount of debenture stock originally issued was (being a quarter of the capital stock).	£1,235,000
The Association has purchased and cancelled	85,360
Leaving, as aforesaid	£1,149,640

SIXTY PER CENT. OF CAPITAL STOCK TO BE RETURNED.

As the German assets before the war yielded rather more than half the net profits, it is proposed that out of the moneys received on account of their liquidation, something more than half the capital stock of the Association should be returned to the proprietors. The Board, after giving careful consideration to the matter, have decided that a return of 60 p.c. of the capital stock will be adequate. Sixty p.c. will require the sum of £2,964,000.

SIXTY-FIVE PER CENT. OF THE DEBENTURE HOLDINGS TO BE RETURNED.

As regards the debenture stock, our Act of 1916, section 9, provides that the Association shall not reduce their nominal capital unless, simultaneously with such reduction, they redeem any then outstanding debenture stock to a nominal amount equal to one-fourth part of the nominal amount by which the capital is reduced. One-fourth part of the proportion of the capital stock which it is proposed to return—viz., £2,964,000—equals £741,000, which is the nominal amount of debenture stock which we must return to the holders. This £741,000 at 105 p.c. will require the sum of £778,050. Calculated as a percentage upon the debenture stock outstanding, this amount of £741,000 represents the awkward figure of 64·455 p.c. As there is nothing against our returning more than one-fourth part of the outstanding debentures, we propose to return to each stockholder 65 p.c. of his holding at the rate of £105 p.c.—that is to say, for every £100 of his holding he will receive the sum of £68 5s. I should here like to make an apology. At our last meeting in May, when I anticipated what I am going to put before you to-day, I told the shareholders that the debenture stockholders would receive £63. To-day you will see from the figures I give, they must receive £68 5s. I had to make what observations I did on that occasion rather hurriedly; and without referring strictly to our Act of Parliament, I laid emphasis on the point (which some of the proprietors noticed) that we were obliged to redeem of this outstanding debenture stock a nominal amount equal to one-fourth part. In my hurry, I thought only of the reduction "to" the amount, and not "by" the amount. I had not recollected the fact of the amount we had redeemed when I made the calculation. Therefore this larger sum which I have mentioned will have to be paid. I trust the proprietors will excuse me. Now as our Act prescribes that the debenture stock shall be transferable only in amounts of £10 or multiples thereof, the calculation at the rate of 65 p.c. will leave in certain cases amounts which are not multiples of £10—this being the amount of stock below which you cannot hold. Thus a holder of £150 debenture stock will have £97 10s. of his holding paid off, and be left with £52 10s. stock. We propose that the Association purchases at 105 p.c. such odd amounts as will reduce the holding to a multiple of £10—in the case instanced, £2 10s. will be bought at the price of £2 12s. 6d. If it be agreed that 65 p.c. of the outstanding debenture stock be paid off, the figure yielded is £747,266 at 105 p.c.—£784,629 6s. If the odd amounts are purchased, these figures will be slightly increased; but £2000 to £3000 will cover the extra cost.

THE NEW CAPITAL POSITION.

If the Directors' proposals be accepted, the capital stock will, instead of £4,940,000, stand at £1,976,000. The debenture stock instead of £1,149,640 will stand at £402,374 nominal, which, considering the assets of the Association left to it—its gas and electricity works in Brussels, its gas-works in Antwerp, its gas-works in Holland (at Flushing), and in Czecho-Slovakia (Lieben-Prague, Saaz, Brüx, and Graslitz), its large interests in the Compagnie Continentale du Gaz in France, its freehold property at home and abroad, and its investments—cannot be considered over-capitalization.

WHEN THE PAYMENTS WILL BE MADE.

As to methods and time of payment, if we carry our proposals, we will arrange—

(1) That the 20 p.c. distribution of interim dividend be posted on the earliest date possible, but not later than Jan. 10.
(2) As regards the debenture stock, the interest for the six months ended Jan. 31 will be paid on Feb. 15 as usual. The redemption of 65 p.c. of the debenture stock at 105 p.c. will take place on March 1, and cheques for the amount of the redemption money will be forwarded to the registered holders on and after that date in exchange for the stock certificates which must be surrendered. One month's interest on the 65 p.c. debenture stock so redeemed will also be payable on March 1.
(3) The capital stock will be reduced and paid off to the extent of 60 p.c. on March 1.

NEW OFFICES.

No doubt it is an open secret that we have signed a contract for the sale of the present offices at 21, Austin Friars, as being too large and expensive for us in our more humble circumstances. The matter was referred to the other day in a speech by the Chairman of Lloyds Bank when he told the shareholders they had acquired our offices. We have instead purchased premises at No. 6, London Wall. We shall be moving into our new quarters in February, and what with the work involved in this repayment and in the removal of our offices, our staff will be pretty busily engaged during the next few weeks. Full instructions with regard to the redemption of the debenture stock and the reduction of the capital stock will be circulated in due course so that everyone will know exactly what it is necessary to do. In view of the large amount of work which our staff will be called upon to cope with, I will ask you to refrain, as far as possible, from making personal inquiries at the office; if you are in doubt on any point connected with this matter, will you be so good as to send a written communication instead, and the matter will be fully dealt with.

PENDING CLAIMS ON GERMANY.

Before putting our proposals in the form of a motion, it may be well to indicate the present position as regards our claims on Germany. It will be within the recollection of the proprietors that at the general meeting on May 5, 1920, I stated that I computed the minimum amount the Association could receive in sterling would be £5,695,045.

	£ s. d.
On Oct. 16, we received on account, on our claim for a pre-war debt as principal and interest, less commission at 2½ p.ct., the sum of	181,278 13 2
On our claim for the proceeds of the liquidation of our businesses	4,740,527 14 10
Making together	£4,921,806 8 0
If we add to this the amount of commission charged, which had not then been taken into account	29,057 17 2
The total up to the present recovered from Germany is	£4,950,864 5 2

[Which, so far, falls short of my estimate by £744,181.]

The amounts which we now propose to distribute—viz.,

20 p.ct. interim dividend	£988,000
60 p.ct. return on capital stock	2,964,000
65 p.ct. return on debenture stock, approximately	786,000
Total	£4,738,000 0 0
Employed to pay off the banker's loan at Brussels	36,832 8 3
Total	£4,774,832 8 3
Net amount received	£4,921,806 8 0
Leaving a balance of	£146,973 19 9

NO PREDICTION AS TO FURTHER PAYMENTS.

The question may be asked what more we are likely to receive on account of our claims. I will anticipate the question by frankly stating that I do not know, and cannot frame any estimate. We are convinced that our Clearing Office Authorities here will do their very best to effect a settlement favourable to the Association; to say more at the present moment might be prejudicial to the Association's interests. You may rest assured that, as on this occasion, immediate information of any further large settlement will be conveyed to you either through the Press or by circular direct; and I crave your indulgence. We shall hold our annual general meeting in May next; and

I hope on that occasion to be in a position to submit to you our accounts and balance-sheet. I now beg to submit the resolutions.

THE RESOLUTIONS.

The CHAIRMAN moved—

(1) That an interim dividend at the rate of 20 p.ct., free of income-tax, be paid upon the £4,940,000 of the Association's capital stock out of ascertained profits accumulated from the workings of past years to those proprietors who were upon the register on Dec. 14, 1920.

Sir HENRY BIRCHENOUGH, Bart., K.C.M.G., seconded the motion, which was unanimously carried.

The CHAIRMAN next moved—

(2) That the nominal capital of the Association be reduced from £4,940,000 to £1,976,000, and that such reduction be effected by returning to each member of the Association on or after March 1, 1921, 60 p.ct. of his holding in stock as on that date.

Sir HENRY BIRCHENOUGH seconded the motion, which was also carried unanimously.

The CHAIRMAN proposed—

(3) That for the purpose of giving effect to the above resolution, the transfer books of stock be closed from March 1 to March 14, both days inclusive.

Sir HENRY BIRCHENOUGH seconded the motion, which was adopted.

The CHAIRMAN moved—

(4) That in compliance with the provisions of section 9 of the Association's Act of 1916, there be redeemed on March 1, 1921, so much of the £1,149,640 3½ p.ct. debenture stock now outstanding as is equal in amount to 65 p.ct. thereof, and such further amount thereof as may be necessary to ensure that the holding of every stockholder after such redemption shall be £10 or a multiple of £10, and that such redemption be effected at the price of £105 for every £100 of such debenture stock.

Sir HENRY BIRCHENOUGH seconded the motion, which was carried.

The CHAIRMAN proposed—

(5) That for the purpose of giving effect to such last preceding resolution, the Directors be, and they are hereby, authorized to arrange with the holders of debenture stock or a sufficient number of them to waive their right to six months' notice of redemption, and to take such other steps as the Directors may think necessary or expedient.

It may happen, the Chairman added, that some people are perhaps foolish, some obstinate, and some may be away; and it is conceivable that a large number of debenture stockholders will not take advantage of the proposals of the Association. Therefore, we must have power to offer *pro rata* to the other debenture holders the privileges which these have declined, or neglected to take advantage of.

Sir HENRY BIRCHENOUGH seconded the motion, which was unanimously agreed to.

FRANKFORT AND OTHER BUSINESS.

Sir PERCIVAL LAURENCE said there was a question that he rather desired to put to the Chairman at the meeting last May; but after listening to the full address and the information given on that occasion, he came to the conclusion that the proprietors would be called together as soon as sufficient progress was made to justify that course. So he thought then it would be more judicious to postpone the question. He did not wish to press the Directors, if they thought it better not to deal with his inquiry. It had reference to their contract with the Corporation of Frankfort, which was made, with the express sanction of the Foreign Office, during the course of the war. As he understood, the amount payable under the contract was to be payable at the conclusion of the war. Did the conclusion of the war under the contract mean the conclusion of the war with Germany—that was to say, the date of the deposit of the ratification of the Treaty of Versailles—or did it mean the conclusion of the war in general—that was to say, on the deposit of the ratifications of the final treaty, which would probably be the treaty with Turkey?

The CHAIRMAN: I think perhaps I may give you information which will curtail your remarks. To all intents and purposes, the money to which you refer has been paid—that is to say in marks. We have received 5,000,000 marks in cash, and have re-lent the balance of the purchase money and interest to the town of Frankfort, as we did not want it over here at the present value of the mark. The matter is now closed, so far as we are concerned. There is no possible chance of our making any further claim in respect of Frankfort.

Sir PERCIVAL LAURENCE said no specific information had been given as to whether it was the intention of the Association to carry on operations in other countries than Germany.

The CHAIRMAN: I can only say we have very large interests in Belgium. We have Antwerp, and all the communes right up to the Dutch border. We have large interests in and surrounding Brussels. Then we own in the Compagnie Continentale du Gaz in France something like 33 million francs of the share capital. We are therefore very largely interested in France. I mentioned our present interests in my speech. But I do not think this is a proper occasion to enter into the general affairs of the Association, because this is an extraordinary meeting to deal with the particular sum of money which has reached our hands. I therefore crave the indulgence of proprietors not to press me with questions of this character.

A PROPRIETOR asked whether the money they were to receive now was to come out of funds deposited with the Official Receiver for Enemy Securities, or did it have to be remitted here?

The CHAIRMAN: I have no information on that point; and I do not care, so long as I get it.

Another PROPRIETOR said as a trustee he should like to know to what period the 20 p.ct. dividend was allocated, and when would the accounts be furnished on which the 20 p.ct. was being paid, because, he took it, it would be trading profit.

The CHAIRMAN: I think I explained at the last meeting, and I have done so again to-day, that this dividend is being paid from past profits. My reference to the 9½d. income-tax (which makes one's mouth water), shows how long ago it was that these profits were made. I do not understand in what way a trustee would be affected in regard to the period the profits covered. We have only acted under section 11 of our 1916 Act, which refers to interim dividends from past profits. This dividend is being paid from past profits, and belongs to the beneficiary, and not to the trustee.

RESTORATION OF DIRECTORS' FEES AND A SPECIAL ADDITIONAL VOTE.

Lord FAIRFAX OF CAMERON said he was informed that at the first meeting after war was declared the Directors, with a view to conserving the funds of the Association, very graciously volunteered to give up a considerable proportion of their fees. This was greatly appreciated at the time; but it had since probably been forgotten by many of the proprietors. It was generally thought that the war would not last more than a year or two; but that did not come to pass. He had made inquiries as to the amount of fees the Directors had foregone up to last June; and it came out in the neighbourhood of £7500. In view of what they had heard that day, and the prospects held out to them, he felt that the proprietors ought to do something for the Directors. Notice had been given that this matter would be brought forward; and he begged to propose that they return to the Directors the £7500 *plus* £5000, making £12,500 free of income-tax. This would, in some way, show the Board how much the proprietors appreciated what they had done in respect of their claims against Germany. They had also heard that the greater part of the commission of 2½ p.ct. for collecting items of this sort had been saved, and that only about ½ p.ct. had been charged. In this matter, and throughout this anxious time, the proprietors had been well served by the Board and the staff. He had also notified the Directors of his intention to propose a resolution regarding the Secretary, who had been their Secretary for 25 years, and had been with the Association, he believed, for 50 years. The Board, however, expressed a desire that this matter should be left with them to deal with. In deference to their wishes, he would not propose this resolution. But he (Lord Fairfax) felt certain that, in view of Mr. Wilson's approaching retirement, all of the proprietors would like to express their gratification at the splendid manner in which he had served them, and to wish him happiness in his retirement. He sincerely hoped the Board would intimate to the proprietors what they proposed to do for Mr. Wilson. For his own part, if they gave their Secretary £12,500, free of income-tax, he would not object. However, his present motion was—"That the Directors be voted a sum of £12,500, free of tax, such sum to include the fees they have already foregone—viz., £7500, and that they divide the sum among themselves as they may desire."

Mr. E. SEBAG MONTEFIORE seconded the motion; and he also made recognition of the admirable way the Directors had got the Association so far through the liquidation of their affairs in Germany. He associated himself with the remarks made by the proposer with reference to Mr. Wilson, and his splendid business qualities. The matter of a suitable acknowledgment of his services when he retired might, in his opinion, be safely left with the Directors.

Mr. JAMES P. R. LYELL, J.P., said he did not want to seem in the least ungracious; but he thought before the resolution was passed, the proprietors ought to have a little more information as to the facts of the case so far as the Directors' fees were concerned. He represented there that day widows who for five or six years had been deprived of a substantial part of their incomes, and had not received one penny. The proprietors ought to hesitate not once but twice before they were generous. Their first duty was to be just. It was because he wanted to ascertain whether the resolution was just that he asked what was exactly the remuneration of the Directors. He could quite understand that the Directors had, during the last few weeks, had more work to do than they had been accustomed to have. It must not be forgotten that their operations had been closed-down all these six years, which had very materially reduced the amount of work the Board had had to do. While he thought there might be some case put forward for some allowance being made for the fees the Directors voluntarily relinquished during the war, he could see no grounds, especially in justice to the proprietors, for giving them a present over and above the sum of those fees. He might be speaking on false premises because they had not been given any information on the subject. He thought it would have been better had the Board, who sanctioned the notice of motion appearing in the advertisement of the meeting, then given the proprietors its terms, and a few details concerning the matter. They knew it was necessary to call this meeting; but it was not necessary to smuggle through a resolution regarding the remuneration of the Directors. If the facts and figures had been given, this speech might have been unnecessary, if he (the speaker) had been satisfied as to the facts. With great deference, he said he thought it had been characteristic of the Association that it had been difficult to extract information.

The CHAIRMAN: It is rather a painful thing to me and my colleagues to be called upon to interpose in any way on this occasion. It is a matter entirely for the shareholders. I only wish to say this: I feel rather offended at several of the remarks made by the gentleman who has just sat down. I am not talking about the question as to whether the Board are to be paid £500 or £12,500, or anything of the kind. That is for you to decide. I cannot believe the gentleman who has just spoken has been for very long a shareholder in the Association, because——

Mr. LYELL: For some years. I should think ten.

The CHAIRMAN: Then you have not been very intimate with our proceedings, because, during those ten years, I have given more than once full details as to our fees. The Board at the outbreak of war had, by resolution of the proprietors, £6000 per annum; and at the moment they are drawing £4500. We were legally entitled at the outbreak of the war to draw our full fees; but we voluntarily gave up part. Whether we should be able to resume the payment of the full fees, we knew not at the time. If the gentleman who has just spoken has been a proprietor for more than one or two years, he must have heard me give, or read of my giving, full information with respect to our fees. The notice by Lord Fairfax was given to the Secretary long before there was any question as to the date the proprietors should assemble. The Secretary told me of it (I believe) a couple of months ago. There was no question of smuggling it through as the last proprietor has talked about; and as to the terms of the proposal,

I was entirely ignorant of them until about five minutes before this meeting. The proposal might have come along at any time; the Directors not being aware whether the proprietors would be called together this month, next May, or next July, until the payment was received in respect of the claims on Germany. It is entirely untrue that there was any attempt to hold the meeting at an inconvenient time; and it is entirely untrue to say there has been any attempt to smuggle the resolution through.

Mr. LYELL moved an amendment, proposing that the Directors be granted the amount of the fees they had relinquished during the war. He did not want to enter into any controversy, and much regretted if he had said anything that had offended the Chairman, who clearly did not understand his (Mr. Lyell's) reference to smuggling the resolution through.

A PROPRIETOR seconded the amendment.

Mr. H. HANFORD thought it a thousand pities the harmony of the meeting should be disturbed by an amendment of this kind. He felt humiliated that such a proposal should have been brought forward at a time when by consummate skill the Board had done so much for the proprietors. What were these few thousands compared with the millions which the Board had so effectively dealt with?

There were cries of "Withdraw the amendment."

Mr. LYELL: I am not going to withdraw.

The amendment was then put. Nine voted for it; and a forest of hands went up against it.

The substantive motion was then put and carried, with applause.

On the motion of Mr. LYELL, a vote of thanks was passed by acclamation to the Chairman and his colleagues.

The CHAIRMAN: I should like to express to you our grateful thanks for your great generosity to-day. The proposal was entirely unsolicited by the Board, who did not know its terms until a few minutes before the meeting. I make no complaint whatever with respect to the courtesy or arguments of those who moved or supported the amendment; and I have no ill-feeling in respect of it.

EUROPEAN GAS COMPANY, LIMITED.

The following statement has, on the instruction of the Directors, been made by Mr. F. Eliot Williams (the General Manager and Secretary) to the shareholders in the European Gas Company, Ltd.

In view of the continued effect upon the Company's operations of the abnormal conditions which have obtained during the current year, it is impossible to forecast the result of the year's working. This will only be ascertained when the accounts are made-up at the end of the Company's financial year on March 31, 1921.

For some time past the Company have been authorized to charge provisional prices which are sufficient to cover the difference between the present and the pre-war cost of supply. The possibility of further loss appears, therefore, to be excluded; and a commencement has already been made with the repayment of the bankers' loans.

With regard to the arrears due to the Company, to which reference was made in the last report, the Company's claims have been admitted in principle; and negotiations are proceeding for the purpose of fixing the amounts. At Rouen the claim has already been settled on a satisfactory basis; and it is hoped that a settlement will be arrived a shortly in the case of the other stations.

Having regard, however, to the amount of the loss on last year's operations, and to the fact that the exact amount of the arrears due to the Company is not yet finally fixed, the Directors do not feel that the position warrants the payment of an interim dividend in February next.

WANDSWORTH AND SUTTON AMALGAMATION SCHEME.

The proposal of the Wandsworth, Wimbledon, and Epsom District Gas Company, which forms the subject of a Bill to be promoted by them in the coming session of Parliament [*ante*, p. 528], for the transfer to them of the undertaking of the Sutton Gas Company, appears to have been criticized by some of the Sutton stockholders; and a circular signed by nearly fifty of them was sent out urging all stockholders to attend the special meeting of the Company on Tuesday of last week. These stockholders—who included Sir Henry Maybury, Mr. J. Ferguson Bell, Mr. F. S. Cripps, Mr. R. J. Milbourne, and Mr. A. W. Oke—referring to the provisional agreement for the sale of the undertaking, said: "The shares of the Sutton Gas Company now stand at probably the lowest on record. The dividend is reduced from 6 to 3¾ p.ct. per annum, less tax; and so in our opinion the present is not an opportune time to amalgamate or transfer the Company's undertaking. . . . The stockholders are to receive an equal amount of stock in the Wandsworth Company to be ear-marked as 'Sutton stock,' which is to be *pari passu* with Wandsworth 'Wimbledon stock,' now quoted at 43-48. Hence, on a cash basis £100 of Sutton stock, for which many shareholders paid £124, is to be transferred to Wandsworth at a little more than one-third they paid for it. There have been recent transfers of Sutton stock at 60-70. . . . Before calling a shareholders' meeting, an opportunity should have been given to all stockholders to inspect the provisional agreement before they are called upon to confirm or reject it."

In reply to this, a circular letter, signed by the Chairman (Mr. Thomas Charles), was sent out to the stockholders, as follows: The terms of amalgamation were clearly set out in the circular which was issued to stockholders immediately after the negotiations with the Wandsworth Company had been concluded; and the Directors see no reason to modify the opinion and recommendations therein expressed as to the advantages which will accrue to both stockholders and consumers. All the points advanced by Mr. Bell (who had the opportunity of stating his views at length at a meeting of the Board) received due consideration. The Board had a written report from Mr. Ernest W. Drew, F.C.A., one of the Auditors of the Company, who, after having examined the proposals from financial and other points of view, unreservedly advised acceptance. Mr. Stephen Carpenter, the Company's Engineer and Manager, expressed himself strongly in favour of amalgamation. The whole question was most thoroughly considered from every aspect before the Directors unanimously decided to recommend stockholders to accept the proposed terms of amalgamation. In order, however, that the stockholders may have the best independent expert opinion, the Directors have invited Mr. W. Doig Gibb, O.B.E., M.Inst.C.E., to make a report on the terms of the amalgamation. He has stated that, in his opinion, having regard to all the present and future circumstances, the Directors have exercised a wise discretion in recommending the amalgamation to the stockholders.

Mr. Doig Gibb, in his report, pointed out that the tendency of the present times is undoubtedly for smaller undertakings to seek for purchase or amalgamation with a larger undertaking. He believes that, with the operation of the Gas Regulation Act, next year (if no amalgamation took place) the price of the "Wimbledon" stock would be higher than that of Sutton, because the last pre-war dividend on "Wimbledon" stock was 6¼ p.ct., as against 6 p.ct. at Sutton. Though the works are in good condition, large expenditure will be necessary in the near future; and the raising of this new capital would be more costly to Sutton than to Wandsworth. In addition, the combination of works of the Wandsworth Company may to some extent, if amalgamation takes place, prevent this capital being immediately required for the Sutton works. The combination also allows the cheaper production of gas. Sutton before the war had a higher price than Wimbledon (allowing 5d. between Wimbledon and Wandsworth) and a lower dividend. This difference will probably be reflected or increased in the new prices fixed by the Board of Trade. Generally, Sutton has less chance of prosperity in the future; and the amalgamation on the terms proposed is one which the Sutton shareholders should accept in their own interests and in the interests of the Sutton consumers.

A Committee of Inquiry Appointed.

Three hours were occupied by the shareholders on Tuesday of last week over the meeting held to consider the proposal; and finally a committee of seven was appointed to go into the matter and report.

In his opening statement, the Chairman (Mr. Arthur Charles) said that before the war gas in Wandsworth sold at 1s. 9d. per 1000 c.ft., as compared with 2s. 6d. in Sutton. By the terms of the agreement, the price of gas in Sutton was at no time to exceed the price at Wandsworth by more than 5d.; and this had now been reduced to a firm 3d. This would mean an immediate increase in the dividends of the Sutton stockholders of ¾ p.ct. on the sliding-scale, in addition to any advantage they might obtain from the Board of Trade by a re-arrangement of the standard price. The gas consumer would get a reduction in price of 6d.

Speaking in opposition, Mr. Ferguson Bell (the Consulting Engineer to the Company) declared that he had done everything he could to urge the Board not to accept the scheme, which he did not think was for the benefit of either the stockholders or the consumers. The terms were entirely inadequate. The Chairman had forgotten to say that in the last two years the price of gas in Sutton was practically the same as that in the whole of Wandsworth. The Sutton works were equipped as well as the Wandsworth works; and he believed their condition was very much better. They could not be replaced to-day for £1000 per million c.ft. of gas produced; and yet they were to be taken over as they stood in the books at about £470 per million c.ft. In 1912 the Wandsworth Company took over the Epsom works, vastly inferior to those at Sutton, for something like £900 per million c.ft. produced. He noticed that the Directors were to get no less than £8333. The draft agreement was also strongly criticized by Mr. Milbourne.

Mr. F. H. Jones, Mr. Doig Gibb, Mr. E. W. Drew, and Mr. F. J. Bancroft spoke on the other side; and before the meeting separated the following Committee was selected to inquire and report: Sir Henry Maybury, Sir Stanley Johnson, and Messrs. J. T. Overton, W. T. Malinson, A. S. Jackson, G. Herrington, and R. J. Milbourne; Messrs. E. W. Drew and J. Ferguson Bell to attend the meetings of the Committee in an advisory capacity.

The meeting then stood adjourned until Feb. 1.

NEW METER STAMPING FEES.

The new schedule of meter stamping fees has been issued by the Board of Trade, and will come into force on Jan. 1. Meters bearing the 1920 seal, it is understood, will be charged up at the present scale; and those bearing the 1921 seal at the new scale. The working out of the schedule is as follows:

Dry Meters.				*Wet Meters.*			
	s.	d.			s.	d.	
2-Lt. ..	1	0	100-Lt. ..	4	0	2-Lt. ..	1	0	80-Lt. ..	4	9
3-Lt. ..	1	0	120-Lt. ..	4	6	3-Lt. ..	1	0	100-Lt. ..	5	6
5-Lt. ..	1	0	150-Lt. ..	5	6	5-Lt. ..	1	0	150-Lt. ..	7	9
10-Lt. ..	1	6	200-Lt. ..	7	0	10-Lt. ..	1	9	200-Lt. ..	10	0
15-Lt. ..	1	6	250-Lt. ..	8	6	15-Lt. ..	1	9	250-Lt. ..	12	3
20-Lt. ..	1	6	300-Lt. ..	10	0	20-Lt. ..	1	9	300-Lt. ..	14	6
30-Lt. ..	2	0	400-Lt. ..	13	0	30-Lt. ..	2	6	400-Lt. ..	19	0
40-Lt. ..	2	0	500-Lt. ..	16	0	50-Lt. ..	3	3	500-Lt. ..	23	6
50-Lt. ..	2	6	600-Lt. ..	19	0	60-Lt. ..	4	0	600-Lt. ..	28	0
60-Lt. ..	3	0	800-Lt. ..	25	0						
80-Lt. ..	3	6	1000-Lt. ..	31	0						

Rowley Regis and the Regulation Act.—On being informed of the Cradley Heath Gas Company's application for an Order under the Gas Regulation Act, the Rowley Regis Urban District Council decided to make a qualified representation to the Board of Trade to the effect that, while they do not object to the Company obtaining an Order in conformity with the new Act for charging the method of measuring the consumption of gas, the Board be asked to ensure that the Company should not be possessed of greater powers than at present in the fixing of the price chargeable for gas, and that there should be ensured to the consumers the requisite power to obtain gas of no less quality than that the Company had hitherto been compelled to supply.

CHESTERFIELD GAS INQUIRY.

An inquiry was held by Mr. H. R. HOOPER, on Tuesday of last week, at the Stephenson Memorial Hall, Chesterfield, concerning the application of the Corporation to the Ministry of Health for permission to borrow £55,000 to pay for the works of the Whittington Gas Company recently acquired by them, and for laying additional mains.

Mr. J. H. ROTHWELL (the Town Clerk) introduced the application, and mentioned that the Whittington Gas Company was a non-statutory undertaking which had been supplying gas to Whittington and Brimington since the year 1865. Recently the Chesterfield Corporation promoted an Extension Bill, under which they sought powers to purchase the Whittington Gas-Works. This saved the cost of a Special Bill; while the fact that they were able to enter into negotiations with the Company averted an expensive arbitration. As a result, they were able to acquire the undertaking without paying a fancy price.

Mr. H. DAVIES (the Gas Manager) said his valuation of the Whittington gas undertaking was £43,000; and the value, based on sixteen years' purchase, was £53,564, giving an average of £48,317 for the two valuations. Adding compensation to Directors and officers, it was decided to offer £51,000. He estimated that to erect such works to-day would cost £80,000. The Company last year made a profit of £3286, which, in his opinion, could be increased. The capacity of the Whittington works was 55,000,000 cubic feet per annum; the present output being 10 millions below this. He explained that the capacity of the Chesterfield Gas-Works was nearly 1¼ millions per day; and the Corporation were ready to erect a water-gas plant capable of producing 400,000 to 500,000 c.ft. per day. At present the maximum demand was 1,050,000 c.ft. per day; this being an increase of 15 p.ct. over the previous heaviest daily demand last year. Then one-third of the retort plant was being renewed during the present year; and the remaining two-thirds would be renewed in the next two years. The demand for gas was also being met by taking 100,000 to 120,000 c.ft. of coke-oven gas per day for Hasland and Grassmoor, where the demand for gas had grown so rapidly that it was impossible to give the district an adequate supply through the ordinary channels without laying 3½ miles of new mains, at a cost of over £30,000. This difficulty had been met by an expenditure of £2200 on mains to connect with the Grassmoor coke-ovens.

There was no opposition to the application.

The Bingley Urban District Council have referred to a Special Committee the question of the control and working of the Cullingworth Gas-Works belonging to the Council. There were strong complaints as to the supply in the Cullingworth area; and it was alleged that work at some mills was delayed because of lack of sufficient gas in the early mornings.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Dec.* 28.

The London tar products market is quiet; but prices generally remain unchanged. Pitch is quoted at not below 225s. f.o.b. makers' works. Creosote is steady at about 1s. 4d. per gallon. Pure benzole and pure toluol are from 4s. 3d. to 4s. 6d. per gallon. Solvent naphtha 95/160 is about 3s. 6d. per gallon.

In sulphate of ammonia, revised prices have now been fixed for the home market for January-May next on a lower level. The British Sulphate of Ammonia Federation announce a rebate to be made in prices already paid over August-December this year.

FROM A MARKET CORRESPONDENT.

Tar Products.

There has been practically nothing doing in the bye-products trade since my last report; the holidays and the tendency of buyers to keep off the markets in anticipation of a fall in values having interfered with business. There is, moreover, no anxiety on the part of sellers to do business until they see how the New Year opens. Pitch seems to be easier; but it is very doubtful whether the proposed combination of South Wales buyers has had anything to do with it. The real reason would seem to be that the general fuel position is likely to be much easier in the coming year. This will naturally affect the situation in pitch, so that people are beginning to believe that highest prices have now been seen in this material. Solvent naphtha remains in poor demand owing to the slackness of trade in the rubber manufacturing industry; but recent values are maintained. Creosote is easier; but this is probably due to the slackening-off in manufactures generally necessitating smaller supplies of fuel. Carbolic acid is quieter, with crystals still a weak market; while cresylic acid has fallen away. The demand for benzole is greater than the supply; but as very shortly the duty is to come off petrol, benzole will probably also be reduced by 6d. per gallon. There is nothing of importance to record in intermediates. Business is quiet and values about as last recorded.

The range of quotations is as follows:

Benzole: 90% London 4s. 1d., North 3s. 10d. to 3s. 11d.; 50-90% 3s. 6d. London, 3s. 3d. to 3s. 4d. North; crude 60-65%, 2s. 5d. to 2s. 7d.; pure, 4s. 3d. per gallon naked.

Crude Tar: London, 105s. to 115s.; Midlands, 107s. 6d. to 117s. 6d.; North, 105s. to 115s. per ton *ex* works. Refined tar, 95s. per barrel (free) on rail.

Pitch: London, 200s. to 205s. per ton f.o.b.; East Coast, 195s. to 200s. per ton f.o.b.; West Coast, 195s. to 200s. f.a.s., with Manchester 200s. per ton and Glasgow 195s. per ton; South Wales, 210s. per ton.

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Solvent Naphtha: London, 3s. 1d.; Provinces average 2s. 11d. per gallon.
Crude Naphtha: Naked, 1s. to 1s. 2d.; North, 1s. per gallon.
Heavy Naphtha: 3s. 2d. per gallon.
Naphthalene: Refined flake, £35 per ton nominal; inferior, £25; crude, £14 to £18 per ton, according to quality.
Toluol: Naked, 3s. 4d. per gallon nominal; North, 3s. 2d.; pure, 4s.
Creosote: London, 1s. 2½d. to 1s. 3½d.; North, 1s. 2½d.; heavy oil, 10½d. per gallon in bulk.
Anthracene: 40-45%, 1s. 3d. to 1s. 4d. per unit per cwt.
Grease Oils: 18° Tw. (naked), £6 5s. per ton f.o.r. makers' works.
Pyridine: 18s. to 22s. 6d. per gallon.
Aniline Oil: 1s. 7d. per lb., drums extra.
Aniline Salts: 1s. 9d. per lb.
Cresylic Acid: Crude, 2s. 6d.; dark 95-97%, 3s. 3d.; 97-99%, 3s. 7d., per gallon, drums free.
Carbolic Acid: Crude 60%, 2s. 3d. per gallon; crystals 40%, 8d. per lb. nominal.
Salicylic Acid: Technical, 2s. 3d.; B.P., 2s. 10d. per lb.
Xylol: Pure, 5s. 3d.; commercial, 4s. 6d. per gallon.
Resorcin: 12s. to 13s. per lb.
Alizarine 20%: 2s. per lb.
B. Naphthol: 3s. per lb.

Sulphate of Ammonia.

Business remains quiet; but the reduction in prices announced last week should lead to further business. The production of sulphate will probably continue to increase; and the question of disposing of the surplus will become an urgent one, necessitating the provision of wider markets.

From America comes the news that the market is dull, with very little trading, although some few lots for immediate business are being sold at prevailing prices.

Calorific Standard at Hull.—The alteration in the system of charging for gas consumed has been the subject of a letter by the British Gas Light Company to the Hull Corporation Gas Committee. The Company expressed a desire to postpone making an application for an Order under the Gas Regulation Act until they had discovered by experience how the new scheme would work. They also wished to be assured that the Corporation would not attack them in the meantime. They were prepared to give an undertaking that the minimum standard should be 450 B.Th.U. During and since the war, the standard had been below 500 B.Th.U.; and the Company did not wish the Corporation to say they were not attaining this standard. The Engineer was of opinion that the delay would be in the interests of the consumers. If the application was made now, a minimum of 460 B.Th.U. might be made. It was decided that no action be taken by the Corporation in the matter within the next twelve months.

The Formby Gas Company State their Case.

An adjourned special meeting of the Formby Urban District Council has been held to consider a motion: "That this Council do approach the Board of Trade with reference to the gas supplied for heating and lighting by the Formby Gas Company; the Council being of the opinion that the standard quality of gas does not comply with the Company's Acts or the Board of Trade regulations." The following statement from the Gas Company was received: "In view of the numerous complaints as to the gas supply which have reached the Company, the Directors feel that, while inviting patient forbearance of the consumers, they owe them some explanation of the trouble the Company are in. Since the recent coal strike, all gas undertakings have been compelled to accept a very inferior grade of coal not suitable for gas making, and have scarcely been able to procure enough even of that. The supplies, also, of enriching agents necessitated by such poor coal have been scarce and uncertain; and the class of labour required is unobtainable. The Company expected to have been able to keep-up the pressure (in spite of the greatly increased demand), had not a recent explosion, which no foresight could have prevented, so reduced the generating plant that it is only by the most drastic regulation of pressure that a continuous supply of gas can be maintained during the coldest and darkest season of the year. No expense or effort of the staff is being spared to overcome these difficulties; and while the Directors greatly regret the inconvenience and irritation occasioned to some of the consumers, they hope to be able to keep the district supplied, and count upon the sympathetic co-operation of the consumers to this end." An amendment was moved and carried that the Council urge the Board of Trade to make an immediate inquiry into the deplorable state of the gas supplied by the Formby Gas Company; pointing out that the quality, pressure, and fumes of the gas were so bad that it was practically useless and highly dangerous. Mr. Cooper said he supposed the Ministry of Mines allocated this coal. Could they not make some representation to the Ministry about the kind of coal supplied? Probably this would help the Gas Company. Mr. Rimmer asked why the Gas Company sought to raise the price of gas, when they knew they were not supplying a proper article.

Theft of Coke.—The Public Control Committee of the London County Council report that a coal officer stopped a van loaded with coke sent out by a gas company, and asked the driver for the weight ticket. The carman produced one for 2 tons; and, after questioning him, the coal officer suggested that they should return to the gas company's weighbridge. The man then stated that his load was 2 cwt. light on crossing the weighbridge, and that two further sacks had been put on. These two sacks he admitted he had dropped at the house of one of the gas company's loaders. Both the carman and the loader were subsequently charged; the former being fined £2 for the theft, and the latter £1 for receiving the stolen coke. The loader was also dismissed from his position.

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Encouragement for Gas Shareholders and Consumers.

Referring to the lately issued Board of Trade returns relating to gas companies, noticed in the "JOURNAL" a few weeks ago, the "Capitalist" says: The returns for 1919 confirm our opinion as to the thorough soundness of gas undertakings; and we advise gas stockholders to secure a copy, and study it at their leisure. We believe it will come as a surprise to many persons, who have only heard of the great difficulties with which gas companies have had to contend, to find that, in spite of all obstacles, considerable progress has been made since 1913. Stockholders especially should realize this fact; for it should give them encouragement and confidence as regards the future. Consumers, also, would do well to study the figures given from their point of view. These persons, who often think they are hardly treated, will discover they are really the only fortunate ones; for whereas the gas companies and the stockholders have both very materially suffered, the consumers have come out of the wood practically unscathed. This is sufficiently proved by the fact that, though receipts have nearly doubled since 1914, the total expenditure on revenue account has more than doubled; so that it is quite apparent that no undue advantage has been taken of those who use gas. We would draw attention to another point brought out by these returns—namely, the fact that, though the distribution of gas has been of lower calorific quality per cubic foot, the actual gas consumed has not risen anything out of the ordinary, taking into consideration the large number of new consumers. When this policy came into force, it met with a good deal of criticism; but it is perfectly apparent that consumers have not had to burn a much larger quantity of gas as a result of the lower calorific quality per cubic foot.

Gas Explosion at Blyth.—An explosion of gas in a house in Grainger Street, Blyth, wrecked the building, and injured the four occupants. The explosion occurred soon after noon; and help was promptly forthcoming. Investigations made by the firemen resulted in the discovery of a big escape of gas from the service-pipes underneath the floor of the house. There had been complaints of a gas escape during the morning. In a house exactly opposite a man and his wife were found badly gassed, and unconscious; and several other people in the locality were affected.

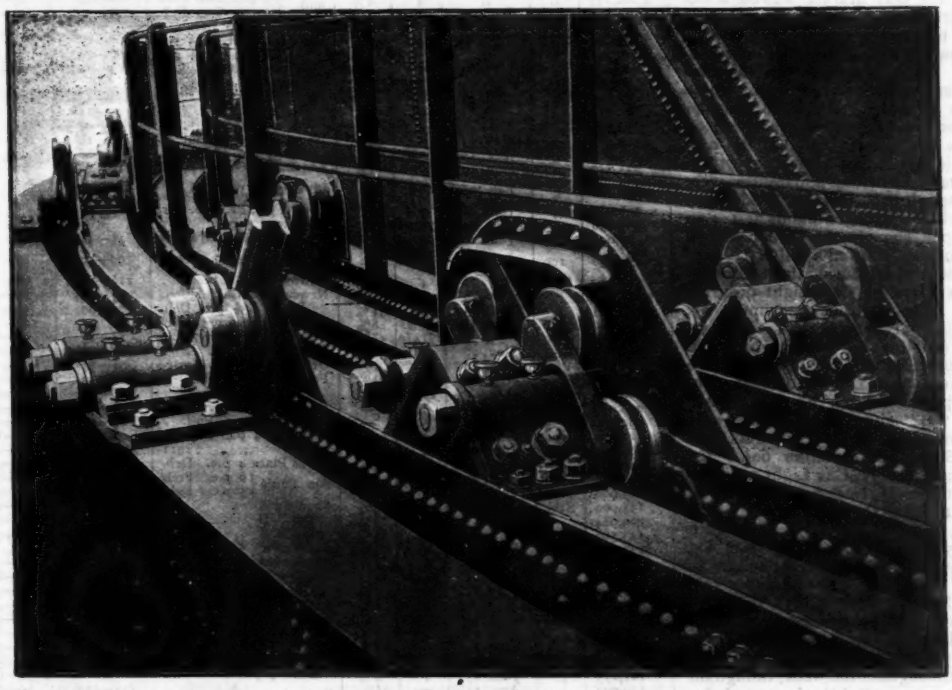
Keeping Faith in Letter and in Spirit.—Attached to the South Metropolitan Gas Company's Co-Partnership Almanack is a message from the Directors, in which they say they are proud to feel that the pledges given to the Company's employees in August, 1914, have been fulfilled in letter and in spirit. With the sympathetic assistance of officials, all of those who returned from fighting the battle for freedom, whether on sea, on land, or in the air, have been re-settled into positions not less favourable than those they relinquished. As a memorial to the fallen ones, there has been founded at Mundesley-on-Sea a convalescent home for the benefit, first, of those injured in mind or body by the war, and, secondly, for those who from time to time may need rest and recuperation.

An Industrial Heating Lecture and a Sequel.

In a paper which Mr. M. A. Preston read before the Engineering and Scientific Association of Ireland, in the Royal College of Science, Dublin, on "Industrial Heating—Coal and Gas," his main contention was that gas-firing is more advantageous than coal. He laid stress on the accurate mixing of gas and air by mechanical means, thus making its working entirely independent of the human element. It was, he said, of interest to note that a machine for this purpose, manufactured in Dublin, had been in operation extensively in the British Isles and on the Continent. Mr. Preston's prediction was that in a few years the firing of steam-boilers by gas would become an established economic fact. A curious incident followed Mr. Preston's discourse. On the following morning, one of the holds-up of tramcars took place in College Green, and all male passengers were minutely searched; pocket-books and documents being carefully scrutinized by an officer. A middle-aged man was taken into custody. On him was found a notebook containing some pages of shorthand, punctuated throughout with the word "Gas" in longhand. He was taken to the military quarters at the North Dublin Union, where he was subjected to cross-examination. He then explained that he had attended Mr. Preston's lecture, being interested as an ordinary householder; and that he had taken some notes which he had hoped would be useful to him. The explanation was accepted; and the man was released from custody.

Proceedings to be Taken at East Grinstead.—A special meeting of the East Grinstead Urban District Council, held "to consider the present unsatisfactory condition of the gas supply in the town," unanimously resolved to instruct the Clerk to take proceedings against the Gas Company. The following results were quoted of tests made by Mr. R. G. Grimwood (the Gas Examiner): First test, 404·8 B.Th.U.; second test, 429·4 B.Th.U.; giving a mean of 417 1 B.Th.U.

Gas-Workers' Wages.—A mass meeting of Sheffield gas-workers took place last Wednesday, to receive a report on an interview which the men's representatives had had with Mr. Ralph Halkett, the General Manager of the Sheffield Gas Company. As stated by the "Sheffield Telegraph" the conference arose out of a decision which had been given by the Regional Gas Council of the West Riding of Yorkshire, whereby considerable increases are sanctioned to gas-workers in the area. According to a clause in the minutes of the last meeting of the Regional Council, an undertaking dissatisfied with the grading, the category, or the wages, can apply to have further evidence heard by the Executive Committee of the Council. This right is now being exercised; it being averred that the National Gas Council never intended such sweeping advances to be given. In so far as Sheffield is concerned, the Regional Council's decision does not give a very large advance to the stokers, the yardmen, and the other sections; but the men on the hourly rates are likely to benefit considerably. In fact, if the present proposition is carried out, it would mean an increase in wages of something like £20,000 per annum to the men in Sheffield.



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MANCHESTER.

Gas-Fitters' Wages at Arbroath.—In view of the fact that the men had received all the industrial awards, the Arbroath Gas Committee felt unable to recommend the Council to comply with a request by the local Lodge of the United Operative Plumbers' Association that the wages of the gas-fitters, where they are lower than that paid to builders' labourers, should be raised to the existing rate for plumbers in Arbroath and district.

Gas Poisoning Fatalities.—An old couple named Riddell were found dead in bed in Dundee with their two-roomed house full of gas. On investigation, it was discovered that the gas had escaped from a rent in the main-pipe, close to the meter; this being caused, it is believed, by the meter being shaken violently in order that the penny might fall through the aperture. In Masbro Road, West Kensington Park, a cabinet maker named Frank Miles and his sister (with a dog) were found dead in their house, poisoned apparently by escaping gas from a main outside. The Brentford Gas Company discovered a split in the gas-main outside the premises, which had been caused by frost.

Power Gas Corporation.—Presiding at the annual meeting of the Corporation, Mr. E. Lloyd Pease said that the balance-sheet exhibited the best year's work they had so far achieved. They were, however, carrying on business in very uncertain times, in which they were bearing very heavy burdens. The profits amounted to £43,477, as compared with £33,561 for the previous year, thus showing a net increase of approximately £10,000, and easily constituting a record. The dividend proposed to be paid amounted to £23,969, as compared with £17,349. The success of the twelve months was more directly due to profitable general engineering work than to the supply of plants for the manufacture of gas and production of bye-products. Mr. Langwell, one of their chemists, had invented a process of fermenting waste straws, whereby it was expected that the production of alcohol, acetic acid, &c., would be cheapened. The ultimate aim of the process was to produce solvents and motor spirit. The patents were being sold to a new concern called Power Spirits, Ltd., who would find the necessary money to investigate the process.

STOCK MARKET REPORT.

It is a pleasurable duty to have to record that a turning has at last been reached in the long lane of depression to which the Stock Exchange has recently been subjected. There was not the faintest prospect of amendment at the start. The opening on Monday showed a very flat tone prevailing in all quarters; buyers holding aloof as much as was possible. Even those markets that were not exposed to direct attack receded sympathetically; and all the old maleficent factors were now reinforced by the failure of Farrow's Bank. This state of things continued the next day, and persistent selling ran its course.

The gilt-edged market was hard-hit. Home Government issues were pressed for sale, and record low figures were reached by Consols at 43⅞, War Loan at 81-⅝, and Victory at 70½. A slight improvement was discernible on Wednesday, and this progressed on Thursday. Pressure to sell was arrested, business began to revive, and the favourable tone enduring until the close was almost cheerful. There was a demand for Home Rails coupled with a general advance. Canadians and Argentines were steady. The Foreign Market did not gather strength; Brazilian, Mexican, Chinese, and Japanese being prominently noticeable.

In the Miscellaneous Market, a marked feature was a recovery in Oils, which closed very firm. Rubber was slightly better, and Iron and Steel also.

Business in the Gas Market was on a fair scale for a short week of four days with four days' holiday to succeed them. Prices were for the most part unchanged, and few quotations varied. Most attention was directed to Imperial Continental, a meeting of which Company was held on Tuesday to consider the distribution of the money received on account of the Company's claim to the proceeds of the liquidation of their property in Germany. The proprietors apparently were somewhat disappointed; and on Wednesday the stock, which had changed hands at 144 on Monday, dropped sharply, and touched 130. The closing quotation showed a fall of 11.

Bargains done for cash during the week were as follows: On Monday, Gas Light ordinary 52½, 52⅝, 52¾, 52⅞, 53, ditto maximum 37, Imperial Continental 142, 142½, 142½, 143½, 144, South Metropolitan 60, 60½, Brighton and Hove 6 p.ct. preference "B" 85½, 86. On Tuesday, Alliance and Dublin ordinary 40, Bournemouth preference 7⅞, Croydon "A" 131, 132, ditto "B" and "C" 98, 98½, 99½, Gas Light ordinary 52½, 52½, 53, Imperial Continental 141, South Metropolitan 60½. On Wednesday, European 5½, Gas Light ordinary 52½, ditto debenture 45, Imperial Continental 130, 131, 132, 132½, 133½, 134, 135, Primitiva preference 19s., ditto debenture 67½, 68½, South Metropolitan 59½, Croydon "E" 94. On Thursday, Croydon "A" 131, 131½, 132, ditto "B" and "C" 98½, Gas Light ordinary 53½, 53½, Imperial Continental 131½, 133, ditto debenture 92, Primitiva preference 19s., 20s., South Metropolitan debenture 47.

In the Money Market, the position was one of marked ease throughout the week, though on Thursday there was a slightly increased demand. Discount business was not very active, and rates ruled steady. Silver was immune from wild fluctuations; the price keeping within the limits of 40 and 40½d. The Bank rate is 7 p.ct., fixed on April 17 last.

Under the title of A. Munday, a company has been registered, with a capital of £5000, to carry on the business of lighting, heating, and gas engineers and dealers in gas and other fittings. The address of the Company is No. 59, Watling Street, E.C.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref.	...	56—61	...
1,551,868	,,	Oct. 14	2½	3 1/16%	Alliance & Dublin Ord.	59—64	38—43	40
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
280,000	5	Oct. 28	7½	8%	Bombay, Ltd.	5½—6½	4¼—4½	...
100,000	5	Aug. 12	16	5%	Bournemouth Gas and Water: 5 p.c.	...	8—9	...
383,110	10	,,	7	7%	Bournemouth Gas and Water: B 7 p.c.	15—15½	8½—9½	...
115,000	10	,,	6	6/-	Bournemouth Gas and Water: Pref. 6 p.c.	13½—14	7½—8½	7⅞
162,065	—	June 25	—	4%	Bournemouth Gas and Water: 4 p.c. Deb.	...	62—64	...
992,045	Stk.	July 14	14	30/-	Brentford A Consolid.	261—266	50—55	...
734,920	,,	,,	11	26/3	Do. B New	204—209	47—52	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	68—73	...
221,400	,,	Dec. 15	4	4%	Do. 4 p.c. Deb.	91—93	58—60*	...
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig.	208—213	110—120	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	75—83	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max.	...	...	...
530,000	20	Sept. 15	12½	10%	British	44—45	20—22	...
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	57—59	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	39—42	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1½—2½	7—7½	...
100,000	10	Dec. 10	—	4½%	Do. 4½ p.c. Pref.	4—6	5—6*	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	...	...
1,513,280	,,	Aug. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	53—56	...
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	...
475,000	,,	Dec. 15	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	42—45*	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	25—30	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—50	...
51,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c.	...	125—135	131—132
278,400	—	,,	11½	7½%	Croydon B and C 7 p.c.	...	90—100	98—99½
492,270	Stk.	—	6	5%	Derby Con. Stk.	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd.	17½—18	5½—6½	5⅝
16,298,975	Stk.	July 29	4/17/4	30/-	Gas 4 p.c. Ord.	98—102	52—55	52½—53½
2,600,000	,,	,,	3½	26/3	Light and Coke: 3½ p.c. max.	76—79	36—39	37
4,062,235	,,	,,	4	4%	Light and Coke: 4 p.c. Con. Pref.	96—99	55—58	...
4,674,850	,,	Dec. 15	3	3%	Light and Coke: 3 p.c. Con. Deb.	72½—74½	44—47*	45
130,000	,,	Dec. 11	10	10%	Light and Coke: 10 p.c. Bonds.	...	...	...
82,500	,,	Sept. 15	5	3½%	Hastings & St. L. 5 p.c.	...	53—58	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	37—39	...
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16½—16½	8½—9½	...
86,600	Stk.	Sept. 15	9	5½%	Hornsey 7 p.c.	...	87—89	...
131,000	,,	Aug. 12	7½	4½%	Ilford A and C	151—154	79—84	...
65,780	,,	,,	6½	3½%	Do. B	115—118	57—62	...
63,500	,,	June 25	4	4%	Do. 4 p.c. Deb.	92—94	55—58	...
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	131—136	130—144
1,235,000	,,	Aug. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	90—95	92
235,242	,,	Sept. 15	6½	5%	Lea Bridge Ord. 5 p.c.	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. A.	211—213	...	...
					Liverpool 5 p.c. Ord. B.	146—148		
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Aug. 12	7/5/6	3½%	Maidstone 5 p.c.	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4½—4¾	1¾—2½	...
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	86—93	...
541,920	Stk.	Nov. 26	4	6%	Monte Video, Ltd.	11½—12	68—73	...
1,875,892	,,	July 29	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	60—61	...
529,705	,,	June 25	3½	3½%	Do. 3½ p.c. Deb.	82—83	50—51	...
15,000	10	Sept. 15	—	8%	North Middlesex 10 p.c.	...	12½—13½	...
55,940	10	,,	7/14/0	5%	,, ,, 7 p.c.	14—15	7—7½	...
300,000	Stk.	Nov. 26	8	8%	Oriental, Ltd.	117—122	93—98	...
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	2—3	...
60,000	50	Aug. 27	13	7½%	Portsea Island, B	128—131	65—70	...
100,000	50	,,	12	6½%	Do. C	118—121	50—55	...
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	⅛—⅛	...
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	1—1½	19/—20/-
521,600	100	Dec. 1	4	4%	Do. 4 p.c. Deb.	91—93	67—69	67½—68½
600,000	Stk.	July 29	4	4%	Do. ,, ,, 1911	...	40—42	...
346,198	,,	June 25	4	4%	River Plate 4 p.c. Deb.	85—87	37—42	...
150,000	10	Sept. 30	6	6/-	San Paulo 6 p.c. Pref.	10½—11	6½—7½	...
125,000	50	July 2	5	5%	San Paulo 5 p.c. Deb.	47—49	38—40	...
135,000	Stk.	Aug. 27	10	5%	Sheffield A	223—224	60—63	...
209,984	,,	,,	10	4%	Do. B	222—224	57—59	...
523,500	,,	,,	10	3½%	Do. C	220—222	54—57	...
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c.	...	...	...
90,000	10	Sept. 30	9	9%	South African	10½—11½	10½—11½	...
6,609,895	Stk.	Aug. 12	5/4/0	30/-	South Met. Ord.	111—113	58—61	59½—60½
250,000	,,	July 14	—	5%	Do. Red. Pref.	...	91—93	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb.	72½—74½	45—48	47
224,820	,,	Aug. 27	8½	3%	South Shields Con. Stk.	157—159	95—96	...
1,087,795	,,	July 29	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	56—61	...
247,558	,,	June 25	5	5%	Do. 5 p.c. Deb. Stk.	116—118	67—72	...
647,740	,,	Nov. 12	7½	3½%	Southampton Ord.	99—102	55—58	...
121,275	,,	June 25	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61	...
120,000	,,	Aug. 12	—	3½%	Tottenham A 5 p.c.	135—138	60—65	...
782,275	,,	,,	6	2½%	Tottenham B 3½ p.c.	115—117	50—55	...
181,255	,,	Dec. 15	4	4%	Tottenham District 4 p.c. Deb.	87—89	55—38*	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Sept. 15	5	3½%	Tynemouth 5 p.c. max.	108½—109	69—71	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Aug. 27	8½	47/6	Wandsworth A 5 p.c.	151—156	75—80	...
255,636	,,	,,	6½	32/6	Do. B 3½ p.c.	129—134	53—58	...
108,075	,,	,,	—	33/3	Do. C	...	50—55	...
140,865	,,	,,	—	33/3	New Ordinary	...	50—55	...
352,000	,,	,,	6½	26/3	Wimbledon 5 p.c.	117—122	43—48	...
98,000	,,	,,	6½	32/6	Epsom 5 p.c.	121—126	50—55	...
88,416	,,	June 25	3	3%	3 p.c. Deb. Stk.	66—69	44—47	...

* Ex Div.

Ashes from the Granton Gas-Works.—At a meeting last week of the Council of the Cockburn Association (a Society founded many years ago for the protection of the amenities of the city) several members raised strong objections to the condition of the foreshore in the neighbourhood of the Granton Gas-Works, due to the tipping of ashes into the Forth. It was felt that, as this part of the foreshore now comes within the extended city boundary, the matter should be brought to the notice of the Town Council; that they should be asked to have the unsatisfactory state of matters remedied; and that a stringent rule should be laid down that all ashes tipped into the Firth of Forth should be taken out beyond the three-mile limit before being emptied into the estuary.

Price of Gas at Cheltenham.—At a meeting of the Cheltenham Chamber of Commerce on Tuesday of last week, the Chairman (Mr. W. Welstead) said he was informed that the Gas Company were seeking powers again to increase the price of gas, and did not think the Chamber should allow them to do this without making some sort of protest. The last time the Company obtained authority to increase their price they put it up to the maximum of 5s. 6d. per 1000 c ft. Now the Company were asking for powers to advance the price to 7s. 6d. per 1000 c.ft., and also to take the measurements by therms. Consumers would no doubt find that, if this application were acceded to, they would have to pay very much more for gas than now. He therefore proposed that the Secretary write in their name, protesting against any further increase. When coal and other things were coming down in price, he thought it should be possible to obtain gas at a cheaper rate than the Company proposed charging. Mr. Sanders asked if a similar protest were to be made to the Corporation against the increased price of electric power. Mr. Dicks pointed out that the cost of electricity for lighting purposes had only gone up 75 p.ct., whereas that for gas had increased by 150 p.ct. He admitted, however, that electric power had gone up 100 p.ct., but said this compared favourably with the Gas Company's increase. In reply to Mr. Dicks, the Chairman said the price charged to the Light Railway Company for current was the same now as before the war; but the contract ended in March, and new terms would no doubt be then arranged. The Chairman's proposition was agreed to.

Cheltenham Gas Company.—In a circular-letter to the shareholders of the Cheltenham Gas Light and Coke Company, the Clerk (Mr. A. H. Wyatt) says: "I am requested by my Directors to inform you that they have recently had under consideration the question of the payment of an interim dividend upon the Company's consolidated ordinary stock. Owing, however, to adverse circumstances—due partly to the regrettable strike of the Company's workmen in August and September last, and partly to the increased cost of coal and materials—it is anticipated that the Company's accounts will not justify the Directors in declaring an 'interim' till the accounts for the whole year are completed, which will not be before the end of January next. It is therefore proposed, when these are ready, to declare a dividend for the whole year payable on March 1 next. An application has been made to the Board of Trade for an Order under the Gas Regulation Act, 1920; and it is hoped that this will be granted early in the new year. It will give the Company much needed relief."

The programmes at the cinema houses and the business in the shops were considerably interfered with last Wednesday evening, by a defect in the main cable of the electric supply at Bromley, Kent.

Robinson Bros. (Nechells), Ltd., has been registered as a private company, with a capital of £20,000, to carry on business in connection with coke, coal, tar, pitch, ammoniacal liquor, and other residual products.

There was an outbreak of fire on the 23rd inst. in the coal-tar plant at the Blackburn (Greenbank) Gas-Works; but officials and workmen promptly extinguished the flames with sand. Over 200 gallons of tar in a still were destroyed; and in fighting the flames one workman was badly burned.

There is considerable distress in Portsmouth due to a large number of men being out of employment; and an effort was made in the town to see that everyone had a good Christmas dinner. In three days over £3000 was raised, exclusive of a large number of gifts in kind. The Directors of the Portsea Island Gas Light Company made to the Committee managing the distribution of the relief fund a gift of 200 tons of coke; the employees giving their services (late and early) free in distributing it.

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PLANT, &c., FOR SALE & WANTED.

FOR SALE—Holmes Rotary Gas- WASHER, 7 ft. diameter, Six Compartments, Vertical Engine in Centre, 16-in. Connections. Only used a few months.
Address No. 6994, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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GAS Plant Ready for Delivery.— CONDENSERS.—Annulars, Set of 8, Outer Tubes 36 in. diam. by 35 ft. high. Set of 4 Outer Tubes 30 in. diam. by 20 ft. high.
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THE Directors of the above Company invite TENDERS for a 500,000 c.ft. per diem CARBURETTED WATER-GAS PLANT, or, alternatively, a BLUE WATER-GAS PLANT, Complete.
The same to be Supplied and Erected at the Company's Works, and to be finished and ready for use by Aug. 31, 1921.
Tenders to be addressed to the Chairman of the Company and Delivered not later than Jan. 17, 1921.
The Directors do not bind themselves to accept the lowest or any Tender.

JOHN BARTON,
Manager and Secretary.

Gas-Works, New Road,
Peterborough,
Dec 22, 1920.

COMPANY NOTICE.

CEARÁ GAS COMPANY, LIMITED.

NOTICE is Hereby Given, that the ORDINARY ANNUAL GENERAL MEETING of the Shareholders will be held at the Office of the Company, 9, Queen Street Place, in the City of London, on Friday, the 31st day of December, 1920, at One o'clock in the afternoon, to receive the Report of the Directors; to elect Directors and an Auditor; and for General Purposes.

By order of the Board,
E. PRATT,
Secretary.

Dec. 23, 1920.

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GAS DISTRIBUTION LIMITED
(Late HELM LAMP COMPANY)
can supply
Everything except the Gas.

WELDED JOINTS ARE OUR SPECIALITY.

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Operated Entirely by One Handle.
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THE MAXIM PATENT CARBURETTOR.

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The GAS LIGHTING IMPROVEMENT CO., Ltd.
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Telephones: 4451, 4452, 4453, and 4454 London Wall.
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FOR
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1¼in. to 12in. BORE.

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Bonlea Foundry,
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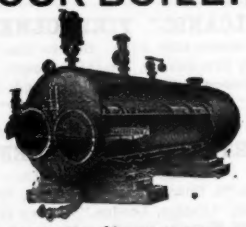

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Two	28 ft. 0 in.	× 7 ft. 6 in. × 160 lbs. W.P.
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Four	28 ft. 0 in.	× 7 ft. 3 in. × 160 lbs. W.P.
Eight	24 ft. 0 in.	× 7 ft. 3 in. × 120 lbs. W.P.
One	28 ft. 0 in.	× 7 ft. 3 in. × 160 lbs. W.P.
Two	28 ft. 0 in.	× 7 ft. 3 in. × 120 lbs. W.P.
One	24 ft. 0 in.	× 6 ft. 6 in. × 120 lbs. W.P.
One	23 ft. 6 in.	× 7 ft. 3 in. × 160 lbs. W.P.

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WOLVERHAMPTON, Eng.

GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLII. No. 3007.] LONDON, DECEMBER 29, 1920. [72ND YEAR. PRICE 8d.

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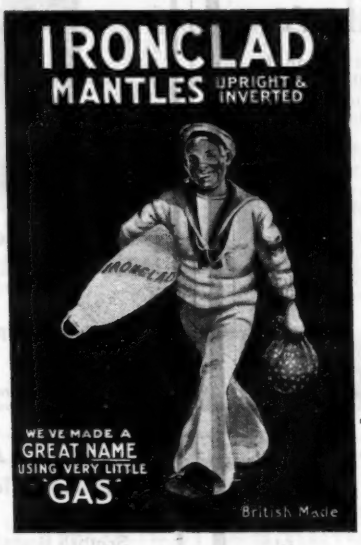

"Be Britons still, to Britain true,
Among ourselves united;
For with nought else but British lamps
Should British homes be lighted."

With apologies to Robert Burns.

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IRONCLAD MANTLES
ARE ALL BRITISH.

UPRIGHT & INVERTED
FOR ALL SYSTEMS.

TERMS ON APPLICATION.

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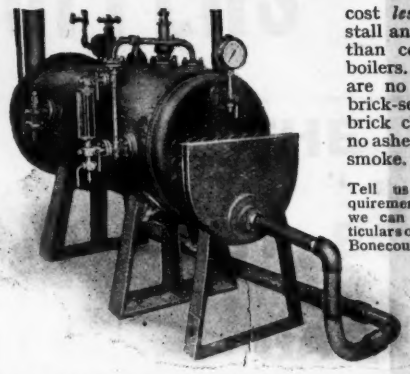

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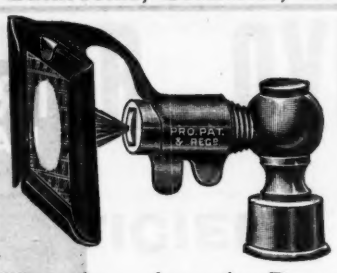
Especially suitable for Halls, Landings, Staircases, Bedrooms, Bathrooms, Sculleries, &c.



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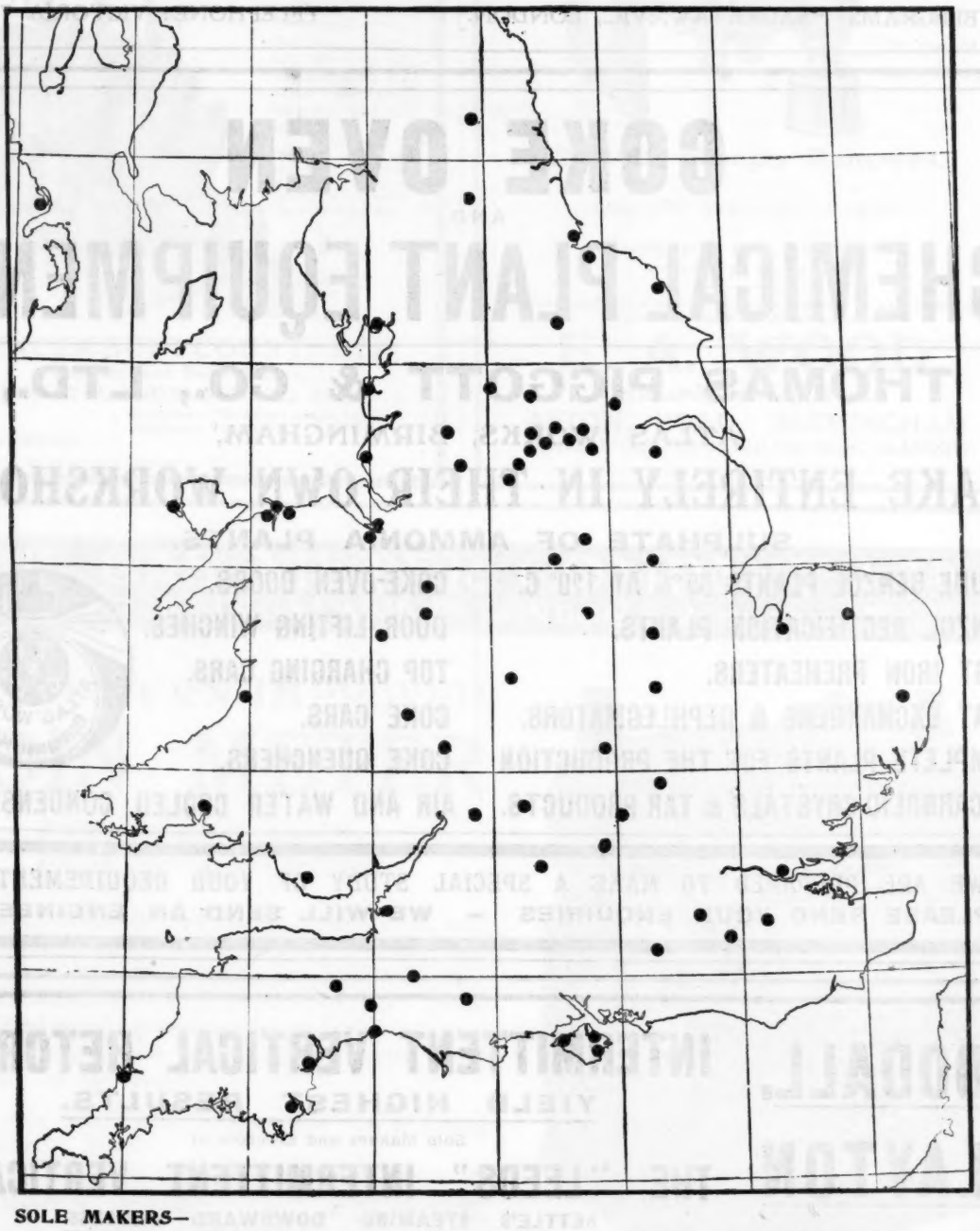

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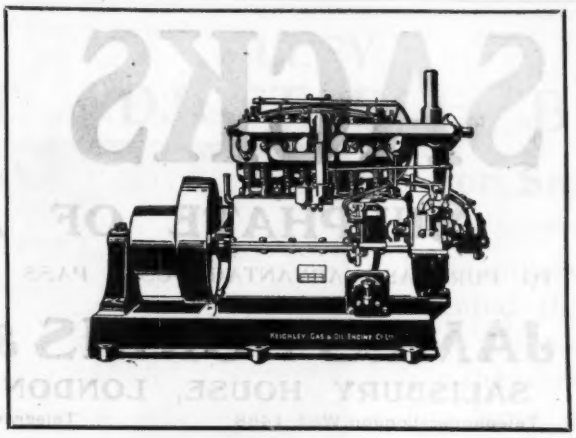

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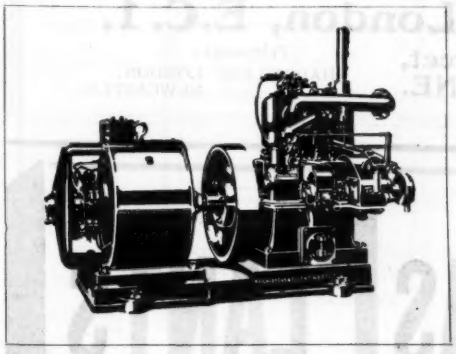

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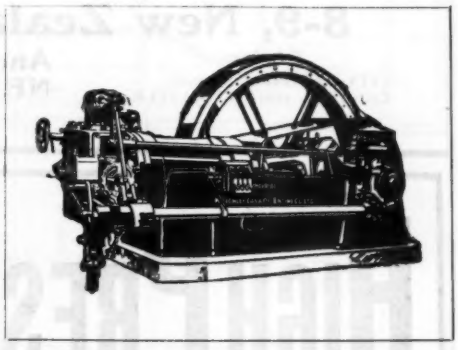

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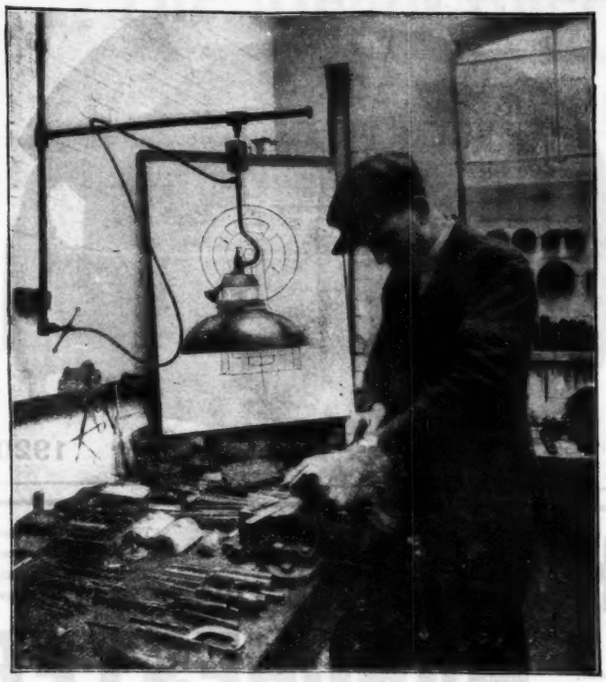

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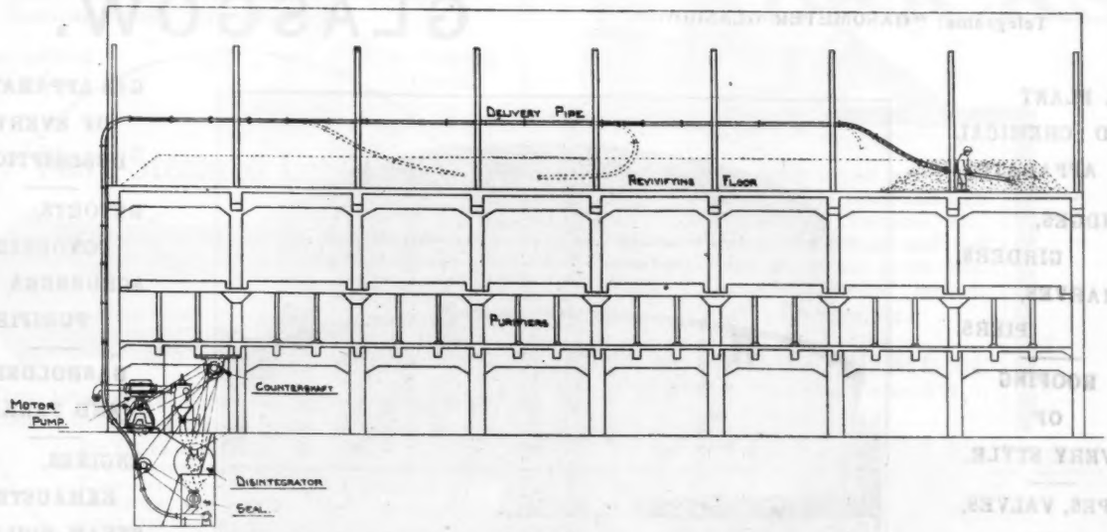

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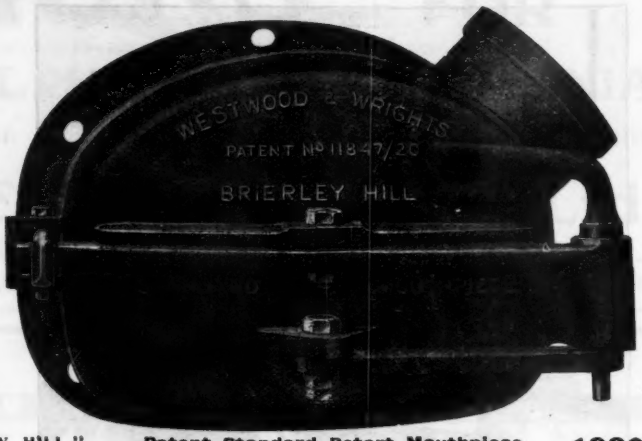

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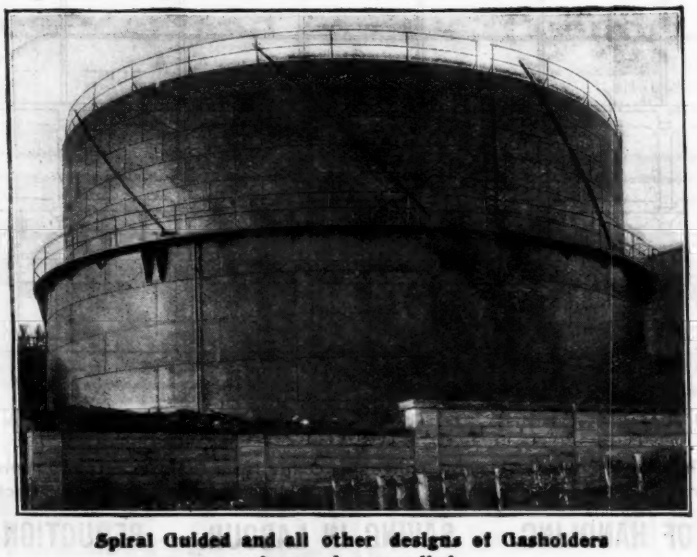

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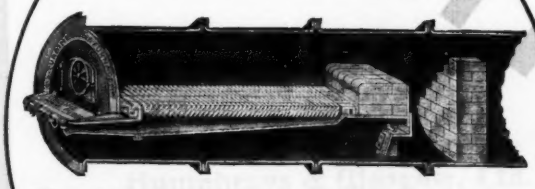

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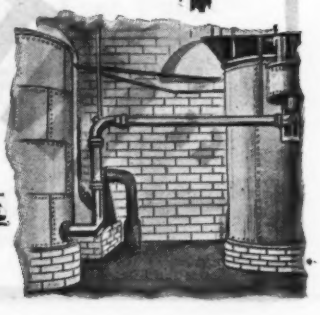

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Tar Dehydration — Tar Distillation
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LEAD REPAIR WORK

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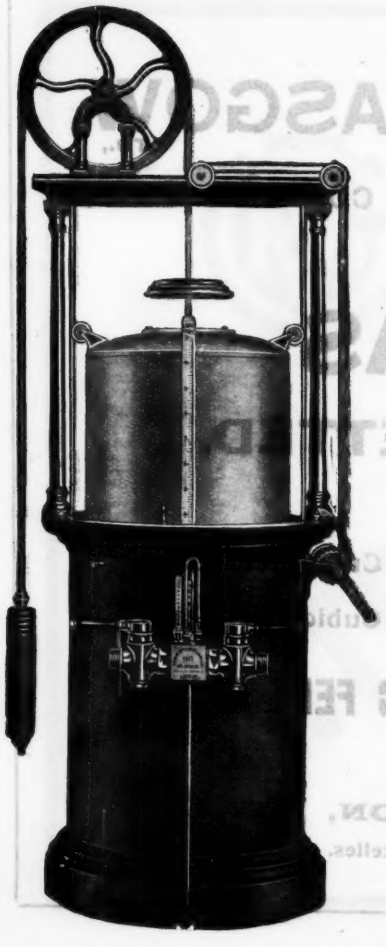

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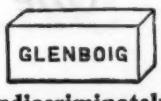
TRADE 

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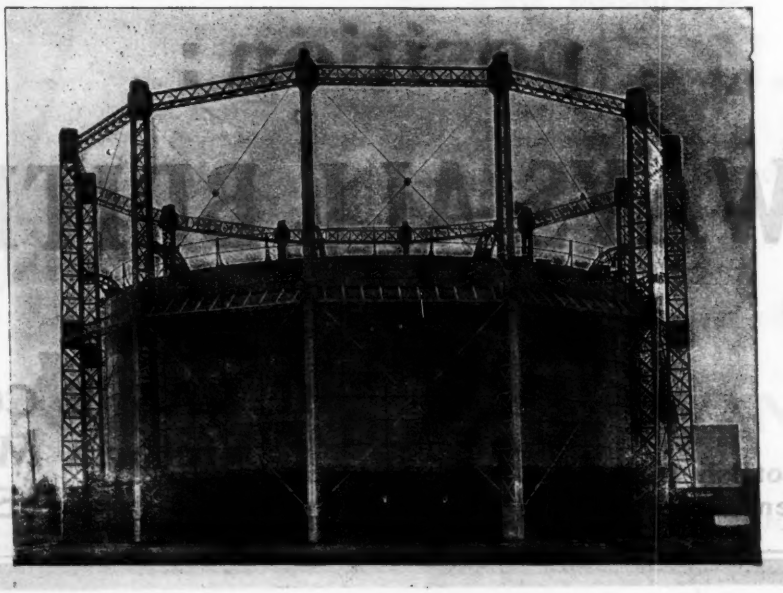

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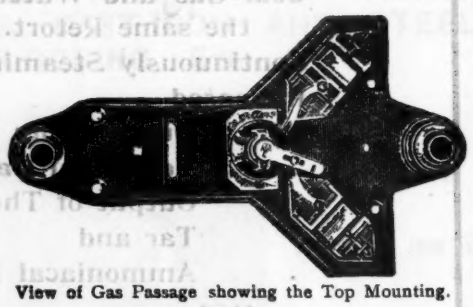

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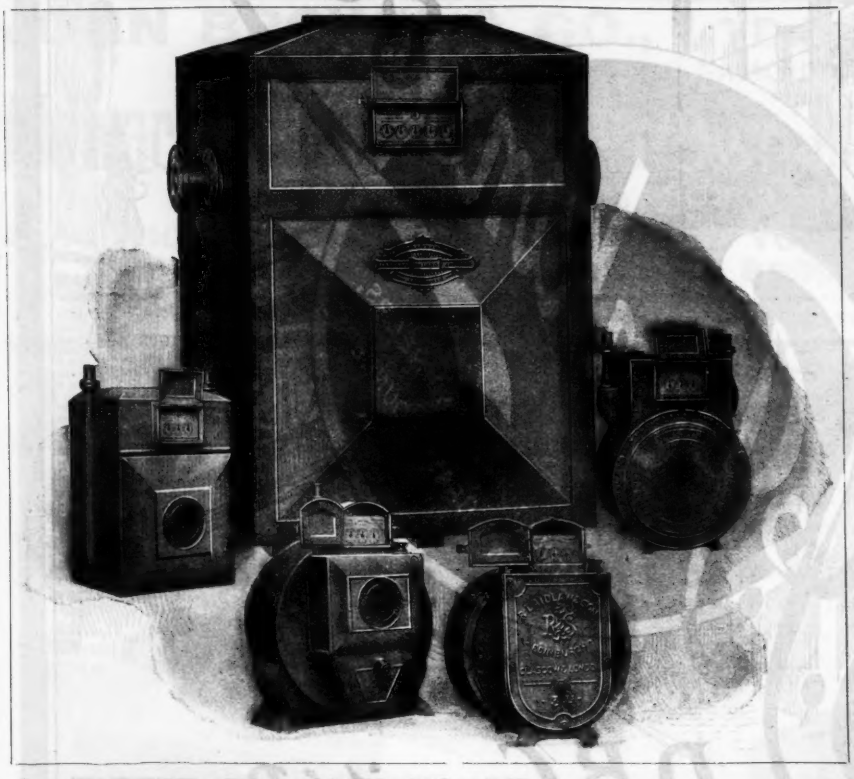

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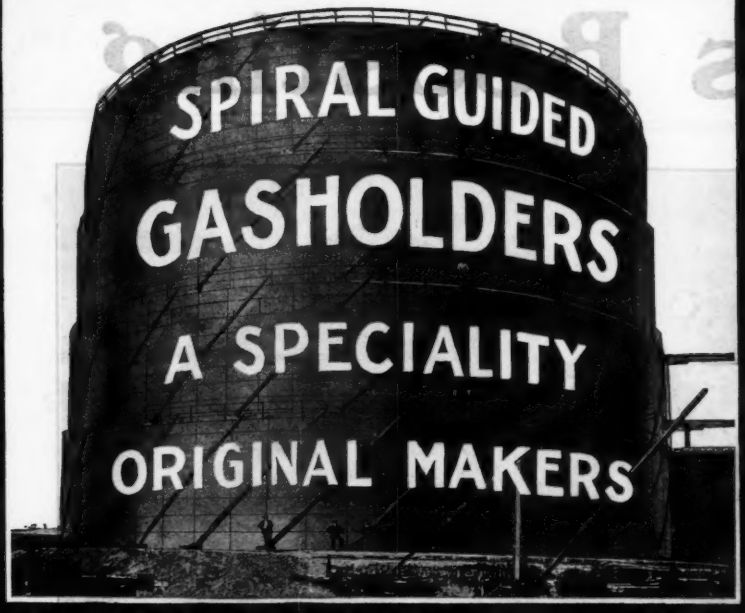

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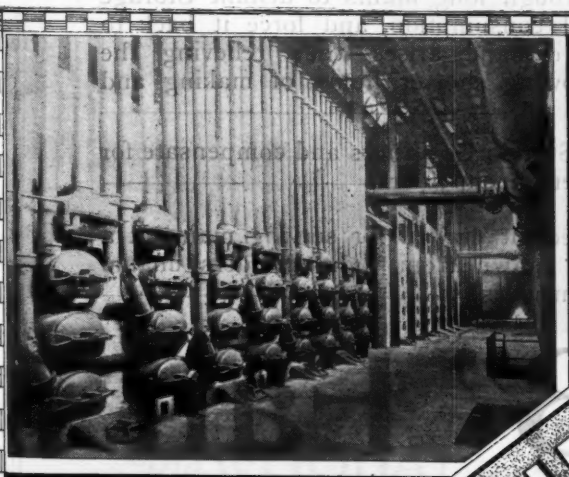

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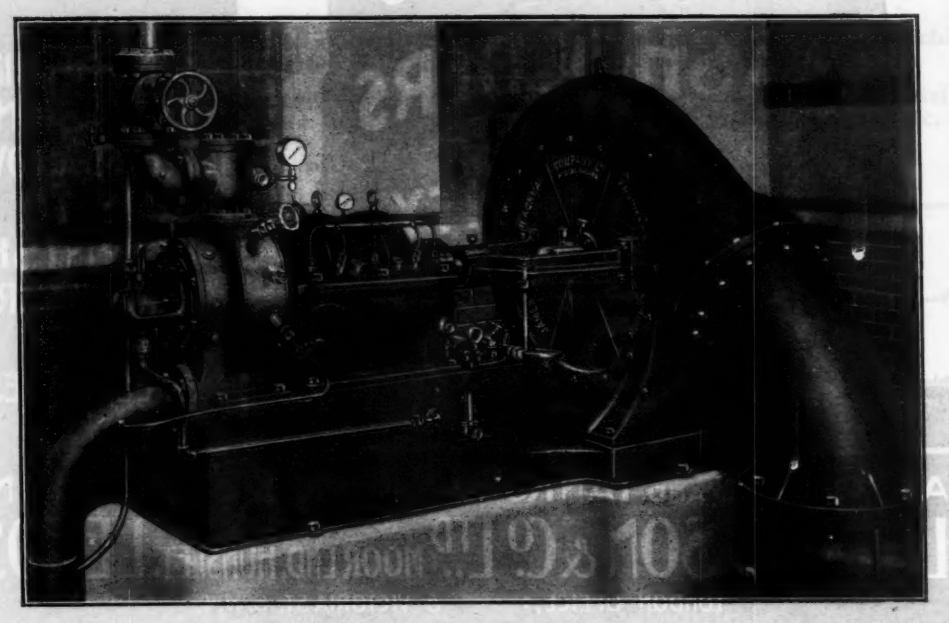

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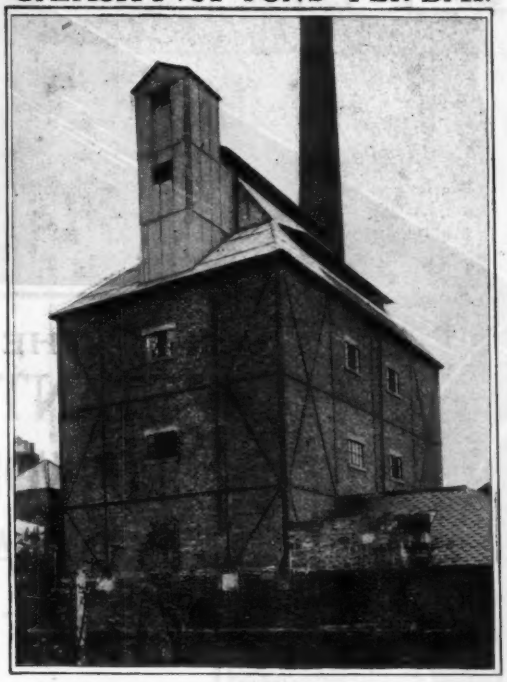

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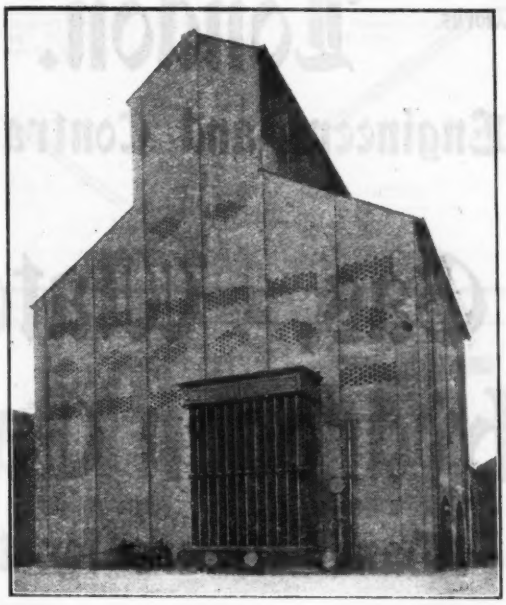

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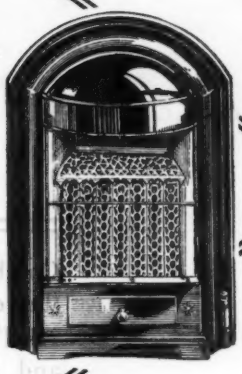

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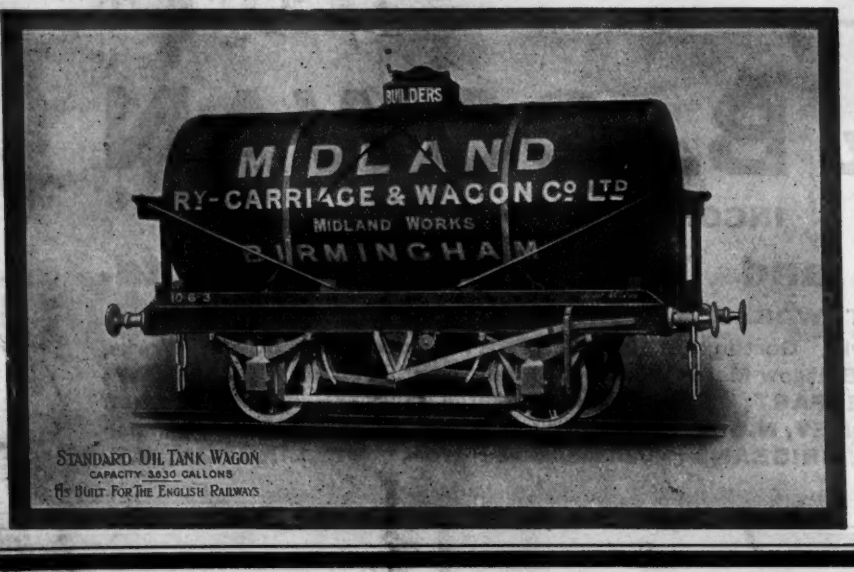

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